

CODEX ALIMENTARIUS COMMISSION



Food and Agriculture
Organization of
the United Nations



World Health
Organization

Viale delle Terme di Caracalla, 00153 Rome, Italy - Tel: (+39) 06 57051 - Fax: (+39) 06 5705 4593 - E-mail: codex@fao.org - www.codexalimentarius.org

Agenda Item 5

CX/FO 13/23/5-Add.1

JOINT FAO/WHO FOOD STANDARDS PROGRAMME CODEX COMMITTEE ON FATS AND OILS

Twenty-third Session

Langkawi, Malaysia, 25 February – 1 March 2013

DISCUSSION PAPER ON A PROPOSAL TO AMEND THE CODEX STANDARD FOR NAMED VEGETABLE OILS: SUNFLOWER SEED OILS (CODEX STAN 210-1999)

**Fatty acids composition of sunflower seed oil obtained from certified seeds sown in different regions of
the Argentine Republic**

Prepared by Argentina

Part 1- Summary (English)

Part 2 – Complete study (Spanish)

Part 1-SUMMARY of the attached study

Page 3

ASAGA I+D

**Fatty acids composition of sunflower seed oil obtained from certified seeds sown in different regions of
the Argentine Republic.**

2001-2002 harvest*

*Original work prepared especially for ASAGA

Page 4

ASAGA presents the final result of the First Project conducted by its research and development division, **ASAGA I+D**. This is a transcendental event for our Association, since it represents the first step toward the concretion of a long-dated ambition: fulfilling our mission, as scientific and technical institution of oils and fats, in satisfying the necessities and interests of the sector. We are grateful to **Nidera** Company for its cooperation in lending the laboratories where the analyses were done, and in particular to **Dr. Amleto Muratorio**, whose determination and rigor were essential in making this work a reality. We also thank **INTA Balcarce** for providing the samples, and **CIARA** (Argentine Oil Industry Chamber) for its institutional and material support to the **ASAGA I+D** program.

Page 5

Authors:

AMLETO MURATORIO

RAMIRO CABELLO

LEONARDO GONZÁLEZ

EDUARDO RACCA

NIDERA S.A.

Abstract

Fatty acids chromatographic characterization is done of oils from sunflower seed certified varieties. Samples were certified by INTA-Balcarce. The study is originated in the need for characterizing Argentine Sunflower Seed Oil on the basis of national representative data, and for updating the genuinity criteria used locally and globally. Sampling and analytical methods are described and the results are analyzed per town and variety. Conclusions are that a range of Iodine Value from 110 to 140 should be accepted for standard regular varieties with oleic acid contents of up to 55%, in agreement with the low limit for “mid-oleic” sunflower seed oil. This opens new opportunities for sunflower: offering traditional, mid-oleic and high oleic crops, with Iodine Values and oleic acid contents which link one with the following, thus composing a broad and continuous spectrum.

Page 6

- **Introduction**

The present study aims at the chromatographic characterization of fatty acids composing oils obtained from certified sunflower seed varieties.

This work is part of the plan conducted by ASAGA, the oils and fats Argentine association, for its research and development program “Programa I+D”, carried out in the Refined Oils Division Plant laboratory of Nidera S.A. company, by engineer Eduardo Racca, Dr. Amleto Muratorio and laboratory technicians Leonardo González and Ramiro Cabello, in the period extending from May 2002 to May 2003.

The samples, collected according to standard procedures, were approved and certified by the Official Organism INTA Balcarce. The harvest selected was 2001-2002 of the National Assessment Network of Sunflower Commercial Crops, the same ASAGIR (1) used for purely farming purposes. In every town, as INTA accustoms, the analysis was also accompanied by the high oleic sunflower seed variety named TRISOL 600.

This has given way to a large interdisciplinary job, involving the oil farming and manufacturing aspects.

- **Purpose**

The study conducted by the ASAGA I+D Program was originated in the need for Argentina -as main producer and exporter of this oilseed- to count on a representative composition analysis of Argentine Sunflower Seed Oil, based on updated national data.

This convenience not only points at having a valuable source of information of technical and scientific interest both on a farming and scientific level, but also has some national and international trading implications.

In fact, in the last years, evidence has been showing -through values obtained in oils from seeds arriving at the extraction plants, and as consequence of the extension of the area sown with sunflower toward the northeast of the country (a region acquiring increasing relevance for this crop)- that such oils presented ever lower unsaturation contents. The ratio of oleic acid (C18:1) to linoleic acid (C18:2) proved higher than in the region of the wet pampas, with values above the unit, thus consequent with Iodine Values below 119 (IRAM 5529 Standard Low). Given that this fact was becoming increasingly significant and was related with standard parameters of genuinity -just like the Refraction Index-, the need became clear to verify this natural condition of traditional crops or varieties, on the basis of exhaustive and suitable sampling. For this purpose, the acidic levels of the oils produced all over the country were to be verified, in relation with weather, latitude and soil conditions, on the basis of -at least- one entire specific crop.

Another as important reason was connected with the due characterization of Argentine “traditional” sunflower seed oil, compared to that of other producer countries and, in particular, regarding certain foreign publications of doubtless international commercial weight (v.gr. that of FOSFA in London, “Guideline Specifications for Crude Sunflower Seed Oil”, 2nd edition, January 1994, in force) which record an Iodine Value ranging from 125.2 to 131.1, and a high for linolenic acid (C18:3) of 0.1% for Argentine sunflower seed oil. Here, this oil is given a mistaken as well as extremely restricted genuinity frame. The present range of such parameters set in IRAM 5529 Standard is much wider, and the one resulting from these last analyses is even more so. As consequence, a new official characterization becomes mandatory, being of utter priority, both in the case of oils for domestic consumption and of those directed to the exporting sector.

- **Sampling**

The samples were taken from the trials of the National Evaluation Network of Sunflower Commercial Crops conducted by INTA experimental units located in the provinces of Chaco, Santa Fe, Entre Rios, Cordoba, La Pampa and Buenos Aires. The trials evaluate hybrid crops recommended for each region by the companies which produce them, and thus vary according to the location of the trial. Of all the genetic materials tested, each trial involved the ten most repeated crops. Within each trial, each hybrid was sown in parcels of three 6-meter-long furrows, following the most usual methodology for this kind of trials. The flowers were uncovered in all the cases.

All the hybrids taking part in a trial were placed in blocks, each trial being composed of three blocks, with the hybrids randomly distributed within each block. The central furrow of each parcel was harvested. The produce of the harvest of each parcel was weighed, and this was the source of the samples to be analyzed. As result, each hybrid was represented by three samples in each town.

Pages 7 and 8

- **Analytic methodology**

Milling

On the basis of certified, individualized and clean seed supplied by INTA Balcarce, for each site or parcel of every town, the milling was done according to IRAM 5593 Standard, with the use of an “Analyzer MCI” blade-mill, obtaining the grinding degree therein specified.

Extraction

1.3 to 1.5 grams of seeds were weighed (according to the estimated content that the ASAGIR publication (1) establishes for each variety) in a 50 ml beaker, which was added 3 ml of chromatographic hexane. The content was repeatedly stirred and macerated with the aid of a 10-cm-long blunt rod, and left to sediment naturally. A 10-ml-capacity tube with 0.1 ml graduation was prepared, equipped with a small funnel fitted with filter paper medium-speed of 9 centimeters of diameter.

The floating sediments were filtered with the help of the rod. Next, 1 ml of hexane was added to the remainder in the beaker and it was macerated once again by stirring several times, left to sediment, and the floating part was filtered. This last operation was repeated 10 to 12 times until 4 ml of extracted oil dissolved in hexane were collected in the graded tube. All this procedure was carried out in the laboratory at room temperature and took from 3 to 4 hours, including intervals of slow dripping and a significant and convenient evaporation of the hexane (of 13 to 15 ml used, 4 ml are collected in the tube). This method made it possible to extract around 90% of the oil of the milled portion.

Chromatography

1 microliter of methyled sample is injected with sterifying solution (in compliance with ISO 5509) and a uniform chromatogram of the whole area is obtained, complete in its fatty acids. The chromatographic conditions (IRAM 5651 Standard) were as follows:

- *GLC Hewlet Packard HP 6890 chromatographer*
- *Innowax column 30m 0.25 mm*
- *Oven temperature: 195 degrees C*
- *Helium flow 0.80 ml/minute*
- *Injector temperature 220 degrees C*
- *Flamme Ionization Detector (FID)*
- *Detector Temperature 250 degrees C*
- *SPLIT ratio 170/1*

- **Analysis of the results**

The analytic spectrum comprises twelve (12) certified sunflower seed varieties, including the before mentioned TRISOL 600; sampling was done on 15 different soils as is the ordinary practice in all tests carried out by INTA in its Balcarce Unit.

Figure 1 maps the towns throughout the country where the analyzed seeds originally came from.

The double-analyzed samples totaled 441. This was done through gas chromatography of their fatty acids, from the myristic acid (C14:0) to the lignoceric acid (24:0), scanning 14 fatty acids present, which include the most important and significant ones of sunflower seed oil, such as palmitic (C16:0), stearic (C18:0), oleic (C18:1), linoleic (C18:2), linolenic (C18:3) and behenic (C22:0). From each acidic composition, the oil Iodine and Saponification Values were calculated, as well as those of the corresponding triglycerides. The triglycerides medium molecular weight was calculated too, and the number of double bonds (unsaturation) of these average molecules. The percentages of saturated and unsaturated fatty acids of each oil are also informed, as well as their ratio. The ratios of palmitic to stearic and of oleic to linoleic have also been expressed, as well as their addition.

Figure 2 presents a graph of the averages of oleic acid, linoleic acid and iodine values for the different towns. Table 1 includes the data of all the fatty acids as per town. Besides the averages, also included in the table are the high and low values.

Figure 3 shows these same averages including the addition of the oleic and linoleic acid values for the different towns. It should be noted that the latter is constant throughout all the towns of the country.

The bars in Figure 4 represent the high, low and average values of oleic acid, iodine value and refraction index of all the towns.

Figure 5 graphs the variations in the averages of oleic and linoleic acid and ponderal iodine value for each variety. Table 2 includes the data as per variety of all the fatty acids, including averages, lows and highs.

Finally, Figure 6, in way of a general summary, exposes the high, low and average values of oleic and linoleic acids, and of the Iodine Values, of all the varieties and all the towns.

From the results obtained, it may be seen that in the northeastern region of the country, of 90 individual samples obtained from R.S. Pena, Las Brenas, Reconquista and Rafaela, half (44) show Iodine Values below the 119 set in IRAM 5529 Standard for regular sunflower seed oil; in some particular cases (4 in all), these values were below 110. In many varieties of these northeastern areas, the oleic/linoleic ratio has shown to be above 1.00. This means that the monounsaturated percentages are higher than the diunsaturated ones. In some exceptional cases, the oleic acid content is higher than 55%, whilst in many other cases it is above 50%.

On the other hand, in colder or more southern areas of the Argentine Republic, some varieties –particularly two or three- have shown Iodine Values above the 138 set in the mentioned IRAM Standard, a fact which was accompanied by extremely high values of linoleic acid and low values of oleic acid.

• Conclusions

All the above provides reasonably sound support to assert that, “prima facie”, for sunflower seed oil obtained from traditional crops grown in our country, the Iodine Value should be admitted to fall within a range from 110 to 140 for its genuinity standard specification. This would also lead to accept an oleic acid content of up to 55% for oil regular oil varieties. According to the presently available bibliography, this last range agrees with the possible and reasonable lower limit demandable from a so-called “mid-oleic” sunflower seed oil. This would conceptually open up an interesting and wide analytical spectrum in the prospects of this excellent oilseed, which would go on to incorporate crops of traditional, mid-oleic and high oleic oils, covering Iodine Values and oleic acid contents which would bind the three broad specifications together continuously and uninterruptedly. Their Iodine Values would range from 78 (low for high oleic oil) to 140 (high for the traditional varieties) and their contents of oleic acid would correlatively decrease as those of linoleic acid rise.

Therefore, the present study may be considered to contribute not only to the correct specification of the so-called **traditional** sunflower seed oil in its climatic adaptation in the country, but could also help establish the boundaries of that large grey zone between these oils and high oleic ones, which will now be occupied by those oils of the varieties called “of medium oleic”. As it has already been said, it would be a reasonably necessary condition that among these three groups of varieties there should not appear small grey zones, but, on the contrary, they should bind one another uninterruptedly. At the most, commercial qualities could be advocated, without affecting the sunflower seed oil concept of genuinity, as it is actually this very oil which catalogs or categorizes the respective seed variety, especially when dealing with certified and clean seeds, and from oils obtained in laboratories under optimum conditions.

This extremely wide range of Iodine Values (unsaturation) and oleic/linoleic ratios between a monounsaturated and a diunsaturated would enable to obtain and commercially offer –by farming the seed (in the cases of high oleic and high linoleic) or by farming or manufacturing it (in the case of mid-oleic) - oils with distinctive nutritional value (Omega 6-linoleic), or perhaps larger stability (increasing the oleic content) for specific uses: frying conditions, durability, etc. No other oilseed has so far offered such thing to such an extent.

- **References**

1. Red Nacional de cultivares comerciales de girasol. ASAGIR. Cuadernillo informativo No. 3, Agosto 2002.

Page 9

Figure 1 – Trial towns. National network of sunflower crops

Page 10

Figure 2 – Averages of oleic acid, linoleic acid and iodine value, and ponderal averages as per town.

Page 11

Figure 3 – Averages of oleic acid, linoleic acid, iodine value and addition of averages as per town

Page 12

Figure 4 – Low, high and average values of oleic acid, iodine value and refraction index of all the towns

Page 13

Table 1 – Sunflower seeds – Summary of the sowing of all the towns – 2001-2002 harvest

Page 14

Sunflower seeds – Trials 01 to 27

Page 15

Sunflower seeds – Trials 28 to 54

Page 16

Sunflower seeds – Trials 55 to 87

Page 17

Sunflower seeds – Trials 88 to 108

Page 18

Sunflower seeds – Trials 109 to 132

Page 19

Sunflower seeds – Trials 133 to 165

Page 20

Sunflower seeds – Trials 165 to 198

Page 21

Sunflower seeds – Trials 199 to 231

Page 22

Sunflower seeds – Trials 232 to 261

Page 23

Sunflower seeds – Trials 262 to 291

Page 24

Sunflower seeds – Trials 292 to 321

Page 25

Sunflower seeds – Trials 322 to 351

Page 26

Sunflower seeds – Trials 352 to 381

Page 27

Sunflower seeds – Trials 382 to 411

Page 28

Sunflower seeds – Trials 412 to 441

Page 29

Figure 5 – Averages of oleic acid, linoleic acid and iodine value in sunflower seed oils as per variety

Page 30

Figure 6 – Low, high and averages of oleic acid, linoleic acid and iodine value in all the varieties and towns

Page 31

Sunflower seed oil as per variety grown in the Argentine Republic – 2001-2002 harvest

Page 32

Sunflower seed samples – DK 3915 variety

Page 33

Sunflower seeds – DK 4040 variety

Page 34

Sunflower seeds – VDH 485 variety

Page 35

Sunflower seeds – Aguará variety

Page 36

Sunflower seeds – VDH 488 variety

Page 37

Sunflower seeds – MG-2 variety

Page 38

Sunflower seeds – Trisol 600 variety

Page 39

Sunflower seeds – Carolina variety

Page 40

Sunflower seeds – Paraíso 20 variety

Page 41

Sunflower seeds – ACA 884 variety

Page 42

Sunflower seeds – ACA 885 variety

Page 43

Sunflower seeds – SPS 3102 variety

Part 2- Composición de ácidos grasos del aceite de girasol obtenido de semillas certificadas sembradas en distintas zonas de la República Argentina

**Composición de ácidos grasos del
aceite de girasol obtenido de
semillas certificadas sembradas en
distintas zonas de la República Argentina.**

Cosecha 2001–2002.*

* Trabajo original preparado especialmente para ASAGA.





- ASAGA I+D

**Composición de ácidos grasos del aceite
de girasol obtenido de semillas certificadas
sembradas en distintas zonas de la
República Argentina.
Cosecha 2001–2002**

ASAGA - Asociación Argentina de Grasas y Aceites

A **SAGA** presenta el resultado final del Primer Proyecto encarado por la división **ASAGA I+D** (Investigación y Desarrollo). Para nuestra Asociación este es un hecho trascendente ya que significa haber empezado a concretar una aspiración de larga data, enfocada a satisfacer necesidades e intereses que responden a nuestra razón de ser como institución científica y técnica de los aceites y grasas. Agradecemos la colaboración de la firma **Nidera** en cuyo laboratorio se realizaron los análisis, especialmente al **Dr. Amleto Muratorio** sin cuyo tesón y rigurosidad este trabajo no hubiera sido posible. También agradecemos al **INTA Balcarce** por la provisión de muestras y al **CIARA** (Cámara de la Industria Aceitera de la Rep. Argentina) por su respaldo institucional y material para con el programa **ASAGA I+D**.

**Autores:**

AMLETO MURATORIO
RAMIRO CABELLO
LEONARDO GONZÁLEZ
EDUARDO RACCA
 Nidera S.A.

Resumen:

Se realiza la caracterización cromatográfica de los ácidos grasos de aceites obtenidos de variedades certificadas de semillas de girasol. Las muestras fueron certificadas por el INTA – Balcarce. El estudio se origina en la necesidad de contar con una caracterización del Aceite de Girasol Argentino basada en datos representativos a nivel nacional y en realizar un aporte para actualizar los criterios de genuinidad utilizados local e internacionalmente. Se describen los métodos de muestreo de semillas y de obtención y análisis del aceite, se analizan los resultados por localidad y por variedad. Se concluye que habría que admitir un rango de Índice de Iodo desde 110 a 140 para la especificación normativa de genuinidad de las variedades comunes con niveles de ácido oleico de hasta 55 % lo cual concuerda con el límite inferior que tendría el aceite de girasol de "medio oleico". Esto abre para el Girasol la posibilidad de ofrecer cultivares tradicionales, de medio oleico y de alto oleico abarcando Índices de Iodo y contenidos de ácido oleico eslabonados entre sí, sin solución de continuidad.

Abstract:

Sunflower Oil fatty acids chromatographic characterization from certified hybrids of sunflower seeds has been done. Samples were certified by INTA-Balcarce. The reasons for this study came from the need to have a representative characterization of the Argentine Sunflower oil and to update the genuinity criteria used locally and globally. Sampling and analytical methods were described, and the results were analyzed by region and by hybrid. The need to extend the Iodine Value range from 110 to 140 with oleic acid content up to 55 % as the genuinity standard for the traditional hybrids, was concluded. This agrees with the lower limit of mid-oleic sunflower oil. This opens to Sunflower the possibility of offering traditional, mid-oleic and high oleic cultivars comprising a broad Iodine Values and Oleic acid content spectrum.



Palabras clave: Aceite de girasol - ácidos grasos - ácido oleico - cromatografía - normas - índice de iodo.



Key words: Sunflower oil - fatty acids - oleic acid - chromatography - standards - iodine value.

• Introducción

El presente estudio consiste en la caracterización cromatográfica de los ácidos grasos, componentes de aceites obtenidos de variedades certificadas de semillas de girasol.

Este estudio forma parte del plan encarado por la Asociación Argentina de Grasas y aceites (ASAGA) para el Programa I+D (Investigación y Desarrollo). El mismo fue llevado a cabo en el laboratorio de la Planta de la División Aceites Refinados, de la firma Nidera S.A., por el Ing. Eduardo Racca, el Dr. Amleto Muratorio y los técnicos químicos Leonardo González y Ramiro Cabello, en el período comprendido entre mayo de 2002 a mayo de 2003.

Las muestras, cumplimentando un relevamiento estándar, fueron avaladas y certificadas por el Organismo Oficial INTA Balcarce. La cosecha elegida fue la 2001-2002 de la Red Nacional de Evaluación de Cultivares Comerciales de Girasol, la misma utilizada por ASAGIR⁽¹⁾ para un relevamiento con un enfoque netamente agronómico. En todas las localidades, tal como lo viene haciendo el INTA, el análisis encarado fue acompañado también por la variedad de semilla de girasol de alto oleico denominada TRISOL 600.

Con esto se ha concretado un voluminoso trabajo interdisciplinario entre la faz agronómica y la de la industria aceitera.

• Objeto del trabajo

El estudio llevado a cabo por el Programa ASAGA I+D se origina en la necesidad de que Argentina como principal país productor y exportador de esta oleaginosa, cuente con una caracterización representativa del Aceite de Girasol Argentino basa-

da en datos actualizados a nivel nacional.

Esta conveniencia está orientada no solo a contar con una valiosa fuente de información de interés técnico y científico a nivel agronómico y aceitero, sino que, también, tiene algunas implicancias de tipo comercial a nivel nacional e internacional.

En efecto, en los últimos años se ha venido evidenciando, a través de valores obtenidos en el aceite de semillas recibidas en las plantas de extracción y como consecuencia de la extensión de la siembra de girasol hacia el Noreste del país (zona que fue adquiriendo una relevancia creciente para éste cultivo), que dichos aceites manifestaban tenores de insaturación cada vez más bajos con una relación de ácido oleico (C18:1) a ácido linoleico (C18:2) mayor que en las zonas de la pampa húmeda, con valores superiores a la unidad, consecuentes por lo tanto con valores de Índice de Iodo menores a 119 (mínimo de la Norma IRAM 5529). Dado que este hecho era cada vez más significativo y estaba vinculado a límites normativos de genuinidad, al igual que el Índice de Refracción **se hacía necesario convalidar esta condición natural de los cultivares o variedades tradicionales en base a un muestreo exhaustivo e idóneo.** Para ello se debía recapitular cuales eran los niveles acídicos de los aceites que se producían en todo el país según condiciones climáticas, latitudinales y de suelo, en base, por lo menos, a una cosecha determinada completa.

Otra razón de no menor importancia estaba relacionada con la debida caracterización del aceite de girasol “tradicional” argentino con referencia al de otros países productores y en particular con respecto a ciertas publicaciones extranjeras de indudable peso comercial internacional (v.gr. la de FOSFA en Londres, “Guideline Specifications for Crude Sunflower Seed Oil” 2° edición enero 1994, vigente) donde se consigna un rango de Índice de Iodo de 125,2 a 131,1 y un máximo de áci-

do linoléico (C18:3) de 0,1 % para el aceite de girasol argentino. Allí, se le atribuye a este aceite un marco de genuinidad erróneo y sumamente restringido. El rango actual de dichos parámetros establecidos en la Norma IRAM 5529 es mucho más amplio y el que surge de estos últimos relevamientos es aún bastante mayor. Por consiguiente, se impone una nueva caracterización oficializada, siendo ella de ineludible prioridad, tanto para aceites de consumo interno como para el que se deriva al sector exportador.

• Muestreo

Las muestras se tomaron de los ensayos de la Red Nacional de Evaluación de Cultivares Comerciales de Girasol que conducen estaciones experimentales del INTA ubicadas en las provincias del Chaco, Santa Fe, Entre Ríos, Córdoba, La Pampa y Buenos Aires. Los ensayos evalúan cultivares híbridos recomendados para cada zona por las empresas que los producen, por lo tanto varían de acuerdo a la ubicación del ensayo. De todos los materiales genéticos ensayados, se tomaron, en cada ensayo, los diez cultivares que se repitieron en el mayor número de ensayos. Dentro de cada ensayo, cada híbrido estuvo sembrado en parcelas de 3 surcos de 6 m. de largo, de acuerdo con la metodología más frecuentemente utilizada para este tipo de ensayos. Los capítulos en todos los casos estaban sin enfundar.

Todos los híbridos participantes de un ensayo se ubicaron en bloques y cada ensayo estuvo integrado por tres bloques, con distribución al azar de los híbridos dentro de cada bloque. En cada parcela se cosechó el surco central. El producto de la cosecha de cada parcela fue pesado y de allí se tomaron las muestras para ser analizadas. Por lo tanto, cada híbrido estuvo representado por tres muestras en cada localidad.

• Metodología Analítica

Molienda

Sobre la base de semilla certificada, individualizada y limpia remitida por INTA–Balcarce y para cada sitio o parcela de cada localidad se efectuó su molienda según norma IRAM 5593 mediante molino a cuchillas “Analyzer MC1”, obteniéndose el grado de molienda allí especificado.

Extracción

Se pesaron de 1,3 a 1,5 g. de semilla, (esto según el contenido estimado que de acuerdo a la publicación de ASAGIR⁽¹⁾ corresponde a cada variedad), en un vaso de precipitados de 50 ml. al cual se agregó 3 ml. de hexano cromatográfico. Con una varilla de punta bien roma de 10 cm de longitud se revolvió y maceró repetidas veces ese contenido, dejándolo sedimentar naturalmente. Se dispuso aparte un tubo de 10 ml. de capacidad graduado al 0,1 ml, provisto de un embudo chico adecuado a un papel de filtro de velocidad media de 9 cm de diámetro.

El sobrenadante de la sedimentación anterior se filtró a través del mismo con ayuda de la varilla. Seguidamente, se agregó 1 ml de hexano al remanente en el vaso de precipitados y se volvió a macerar revolviendo repetidas veces, se dejó sedimentar y se filtró el sobrenadante, repitiéndose esta última operación 10-12 veces hasta recoger en el tubo graduado 4,0 ml de aceite extraído disuelto en hexano. Todo este procedimiento se llevó a cabo a temperatura ambiente de laboratorio y demora de 3 a 4 horas, comprendiendo intervalos de lento goteo y una significativa y conveniente evaporación del hexano (de 13 a 15 ml. usados se recogen 4 ml. en el tubo). De esta manera, se consiguió extraer aproximadamente el 90 % del aceite de la porción de molienda.

Cromatografía

Se inyecta 1 microlitro de muestra metilada con solución esterificante (según ISO 5509) y se obtiene un cromatograma de área total uniforme y completo en sus ácidos grasos. Las condiciones cromatográficas (Norma IRAM 5651) fueron las siguientes:

- *Cromatógrafo GLC Hewlett Packard HP 6890.*
- *Columna Innowax de 30 m de longitud y 0,25 mm de diámetro.*
- *Temperatura del horno: 195° C.*
- *Flujo de helio 0,80 ml/mnminuto.*
- *Temperatura del Inyector. 220° C.*
- *Detector FID (Flamme Ionization Detector).*
- *Temperatura del detector 250° C.*
- *Relación SPLIT 170/1.*

• Análisis de los resultados

El espectro analítico comprende a doce (12) variedades certificadas de semilla de girasol, incluida la aludida TRISOL 600 y el muestreo fue efectuado en 15 suelos diferentes del panorama normal que lleva a cabo el INTA en su Estación de Balcarce.

En el mapa de la *Figura 1* se ubican las localidades de todo el país donde se originaron las semillas analizadas.

En total se analizaron por duplicado 441 muestras mediante cromatografía gaseosa de sus ácidos grasos, desde el ácido mirístico (C14:0) hasta el ácido lignocérico (C24:0), con un barrido que comprende la presencia de 14 ácidos grasos, incluyendo los más importantes y significativos del aceite de gira-

sol, como ser el palmítico (C16:0), esteárico (C18:0), oleico (C18:1), linoleico (C18:2), linolénico (C18:3) y behénico (C22:0). A partir de cada composición ácida se han calculado los Índices de Iodo y de Saponificación del aceite, así como los de los triglicéridos correspondientes. Asimismo, se calculó el peso molecular medio de estos últimos y el número de dobles enlaces (insaturación) de dichas moléculas promedio. Por otra parte, se informan también los porcentajes de ácidos grasos saturados e insaturados de cada aceite y su relación. También se han expresado las relaciones de palmítico a esteárico y de oleico a linoleico así como la sumatoria de estos últimos.

En la *Figura 2* se presenta el gráfico de los promedios de ácido oleico, linoleico e índice de iodo para las distintas localidades. En la *Tabla 1* se consignan los datos por localidad para todos los ácidos grasos. En la tabla se incluyen además de los promedios, los valores mínimos y máximos.

En la *Figura 3* se presentan estos mismos promedios incluyendo la suma de los promedios de los ácidos oleico y linoleico para las distintas localidades. Es interesante observar que esta última es constante a lo largo de todas las localidades del país.

En la *Figura 4* se incluyen los valores, mínimo, máximo y promedio de ácido oleico, índice de iodo e índice de refracción de todas las localidades.

En la *Figura 5* se presenta el gráfico de variación del promedio de ácido oleico y linoleico e índice de iodo ponderal para cada variedad. En la *Tabla 2* se incluyen los datos por variedad para todos los ácidos grasos con promedios, mínimos y máximos

Finalmente en la *Figura 6* a modo de resumen general, se incluyen los valores, mínimo, máximo y promedio para los aci-

dos oleico, linoleico y para los Índices de Iodo de todas las variedades y todas las localidades.

El cotejo de los resultados obtenidos, permite observar que en la zona Noreste del país, de cerca de 90 relevamientos individuales obtenidos en R.S. Peña, Las Breñas, Reconquista y Rafaela, la mitad (44 de ellos) arrojan Índices de Iodo inferiores al de 119 establecido en la Norma IRAM 5529 para el aceite de girasol común, llegándose en algunos casos particulares (4 en total) a valores inferiores a 110. En muchas variedades de esas zonas del Noreste, se verifica que la relación oleico/linoleico, es mayor de 1,00; es decir que se presentan mayores porcentajes del monoinsaturado que del diinsaturado, y en algunos casos excepcionales, el contenido de ácido oleico sobrepasa el 55 % estando en muchos otros casos encima del 50 %.

Como contrapartida de esto último se constata que en zonas más frías o sureñas de la República Argentina se ha detectado, en especial en dos o tres variedades de semilla, tenores de Índice de Iodo superiores a 138 establecido en la citada norma IRAM, lo que correlativamente fue acompañado con valores muy elevados de ácido linoleico y bajos de ácido oleico.

• Conclusiones

Lo que precede permitiría suponer, con bastante fundamento que “prima facie”, para el aceite de girasol obtenido de cultivos tradicionales sembrados en nuestro país, habría que admitir un rango de Índice de Iodo desde 110 a 140 para la especificación normativa de su genuinidad. Esto también llevaría a aceptar para el aceite de variedades comunes, un contenido de ácido oleico que puede llegar al 55 %. Este último rango, coincide, de acuerdo con la bibliografía disponible en la actualidad, con el posible y razonable límite inferior que podría exi-

girarse para el aceite de girasol denominado de “medio oleico”. Con ello se abriría conceptualmente un interesante y amplio espectro analítico en el panorama de esta excelente oleaginoso, que pasaría a comprender cultivares de aceites **tradicional**, de **medio oleico** y de **alto oleico** abarcando Índices de Iodo y contenidos de ácido oleico que se eslabonarían entre sí, entre las tres grandes especificaciones mencionadas y sin solución de continuidad. Sus Índices de Iodo variarían desde el 78 (mínimo del aceite de alto oleico) hasta 140 (máximo de las variedades tradicionales) y sus contenidos de ácido oleico correlativamente serían descendentes mientras los de linoleico serían ascendentes.

De lo que antecede se deduce, que el presente estudio contribuye no sólo a la correcta especificación del denominado aceite de girasol **tradicional**, en su adaptación climática en el país, sino que también podría contribuir a establecer los límites de esa extensa zona gris que se había planteado entre estos aceites y los de alto oleico y que en estos momentos va a ser ocupada por los aceites de las variedades que se denominan de medio oleico. Como ya se ha expresado, sería condición razonablemente necesaria, que entre esos tres grandes grupos de variedades no aparecieran pequeñas zonas grises y por el contrario empalmen entre sí, sin solución de continuidad. A lo sumo, podrían derivarse o preconizarse calidades comerciales, pero sin que se afecte el concepto de genuinidad del aceite de girasol, pues es en definitiva dicho aceite el que cataloga o categoriza a la variedad de semilla respectiva, sobre todo tratándose de semillas certificadas y limpias y de aceites obtenidos en laboratorio en condiciones idóneas.

Esta amplísima gama de Índices de Iodo (insaturación) y de relaciones oleico/linoleico entre un monoinsaturado y un diinsaturado, permitiría obtener y ofrecer comercialmente, ya sea por origen agronómico de la semilla (en los casos de alto olei-

co y alto linoleico), como así también agronómicamente o por composición fabril, aceites con un distintivo valor nutricional (w6-linoleico) o bien de mayor estabilidad (aumentando el contenido de oleico) conducentes a usos específicos: condiciones de fritado, durabilidad, etc. Ninguna otra oleaginoso ha ofrecido esto hasta ahora en tal magnitud.

• Referencias

1. Red Nacional de cultivares comerciales de girasol. ASAGIR, Cuadernillo informativo N° 3, Agosto 2002. ■

FIGURA 1 – LOCALIDADES DE ENSAYO. RED NACIONAL DE CULTIVARES DE GIRASOL.

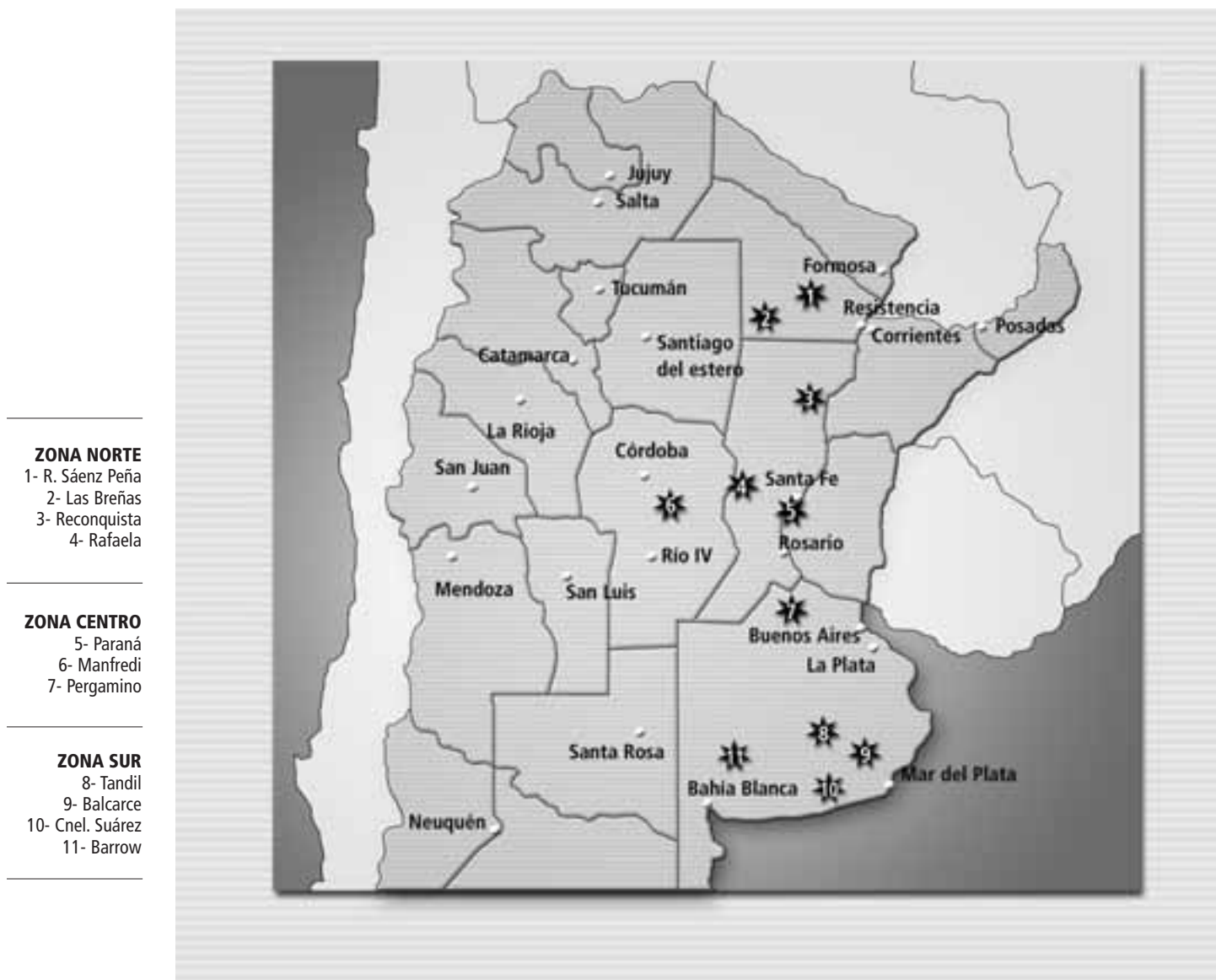


FIGURA 2 - PROMEDIOS DE ÁCIDO OLÉICO, LINOLEICO E ÍNDICE DE IODO Y PROMEDIOS PONDERALES POR LOCALIDADES.

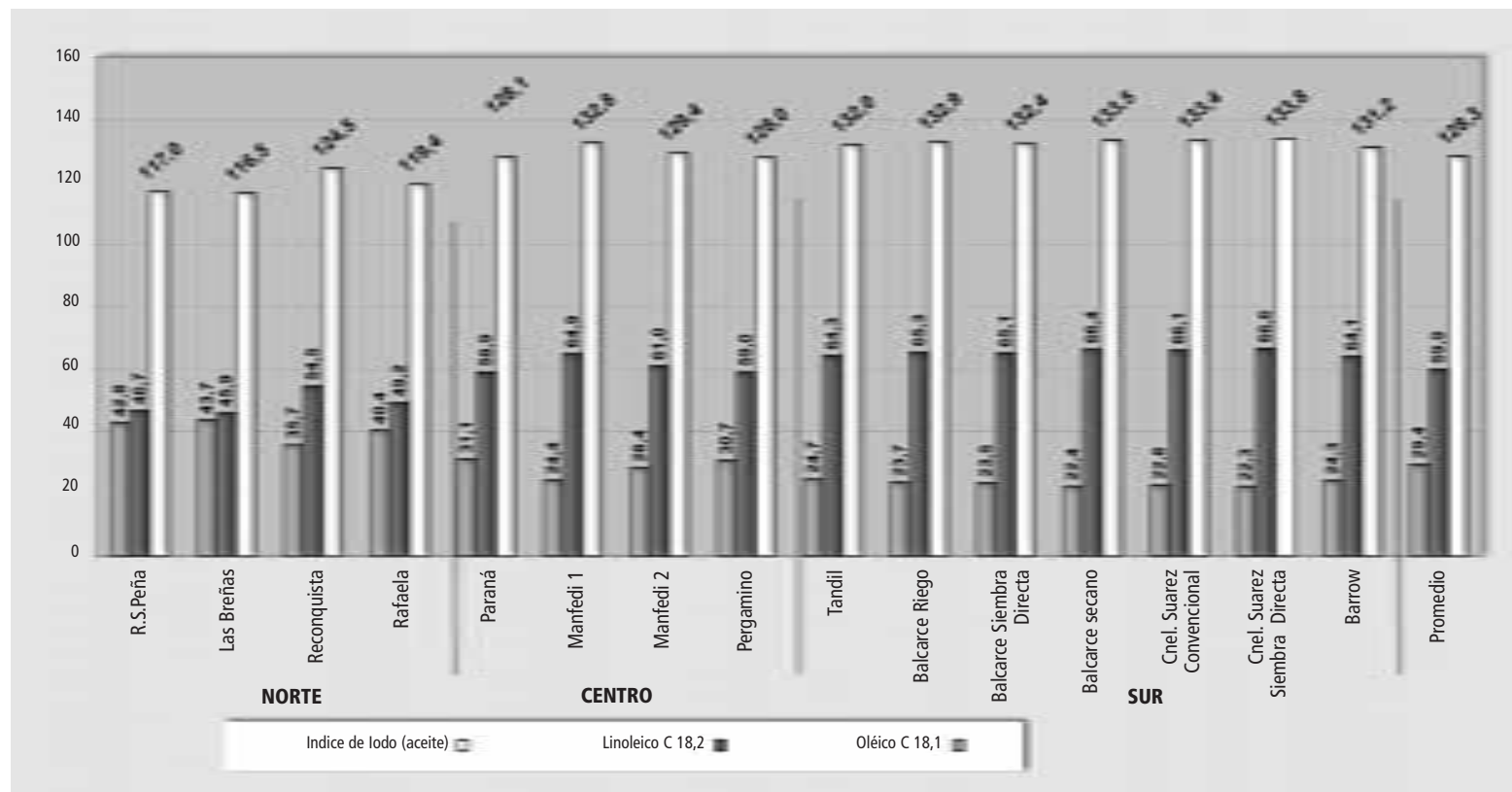


FIGURA 3 - PROMEDIOS DE ACIDO OLEICO, LINOLEICO, ÍNDICE DE IODO Y SUMA DE PROMEDIOS POR LOCALIDAD

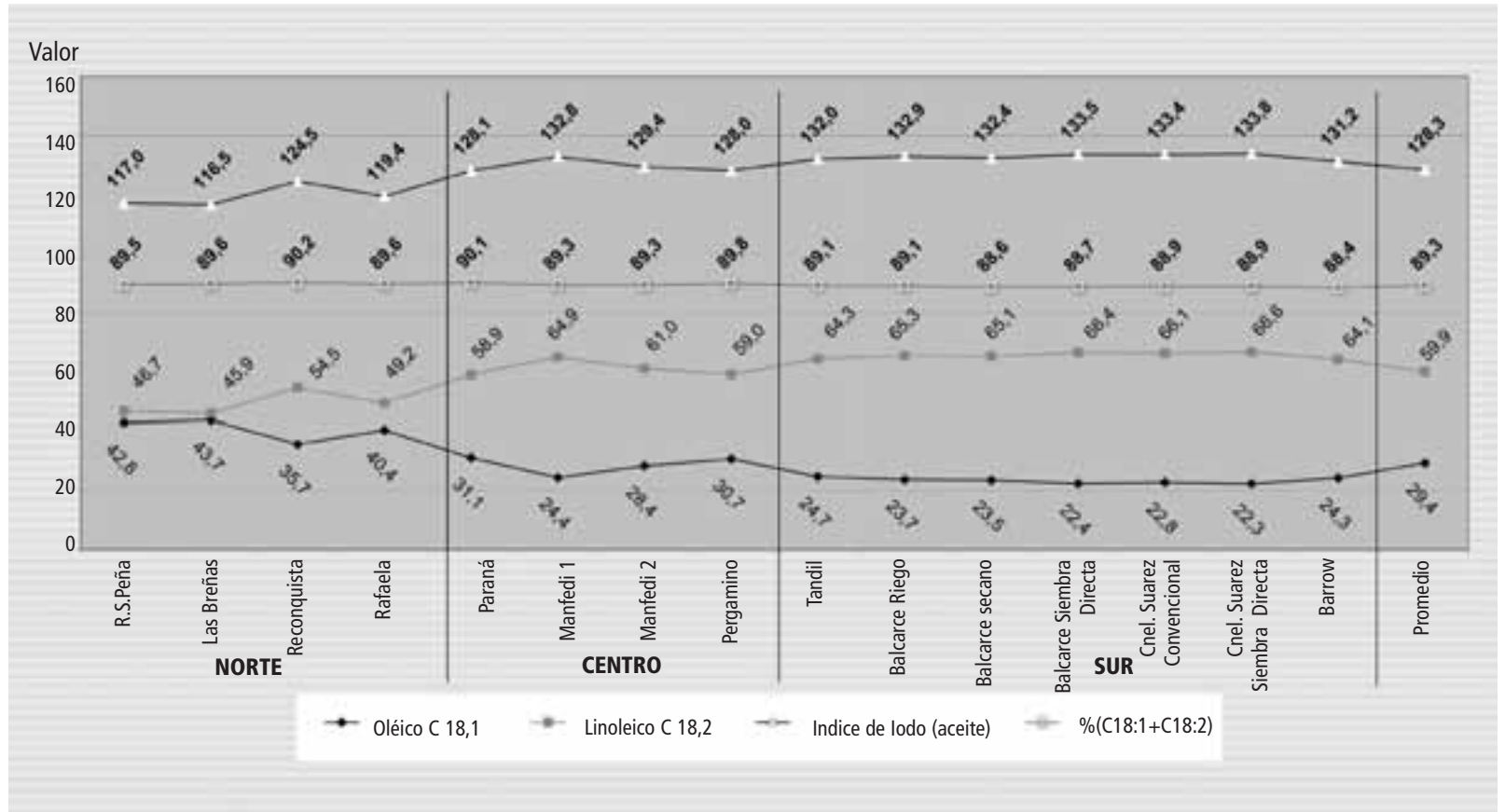


FIGURA 4 - VALORES MÍNIMO, MÁXIMO Y PROMEDIO DE ACIDO OLEICO, INDICE DE IODO E INDICE DE REFRACCIÓN DE TODAS LAS LOCALIDADES.

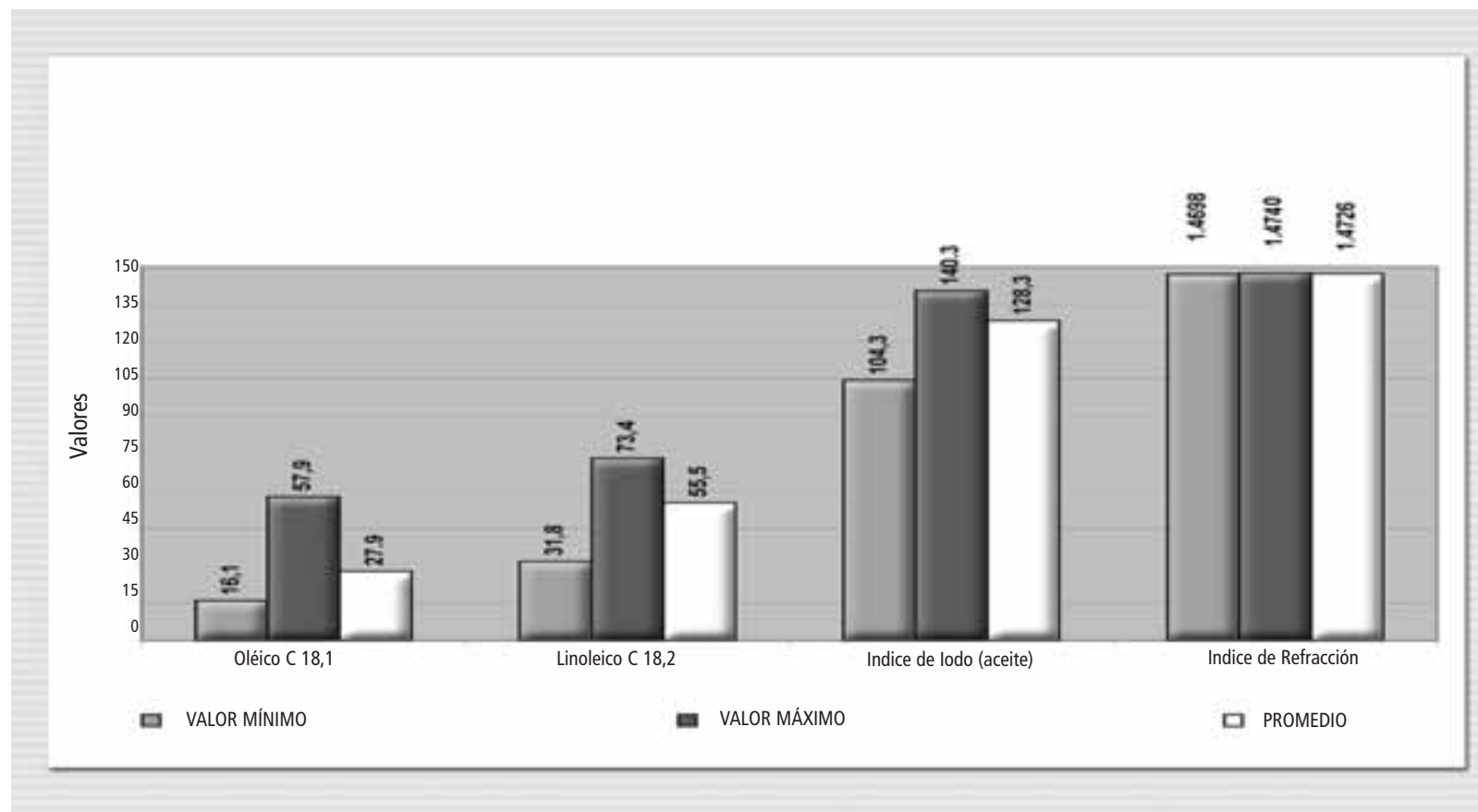


TABLA 1 - SEMILLAS DE GIRASOL - RESUMEN DE SIEMBRA DE TODAS LAS LOCALIDADES, COSECHA 2001-2002

Localidad	R.S. PEÑA			LAS BREÑAS			RECONQUISTA			RAFAELA			PARANA			MANFREDI 1			MANFREDI 2			PERGAMINO			TANDIL			BARROW			BALCARCE RIEGO			BALCARCE SECANO			BALCARCE SIEMBRA DIRECTA			CNEL. SUAREZ CONVENCIONAL			CNEL. SUAREZ SIEMBRA DIRECTA			RESUMEN DE LOCALIDADES			
	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom				
Cromatografía ésteres metílicos de los ácidos grasos																																																	
Mirístico C 14.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0			
Miristoleico C 14.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	
Palmitico C 16.0	4.6	7.5	5.5	4.7	7.0	5.3	5.1	7.7	6.0	4.9	6.5	5.3	3.1	7.5	5.9	5.5	7.4	6.4	5.0	7.1	6.0	4.9	6.7	5.7	4.6	7.9	5.6	5.1	6.7	5.9	4.7	6.4	5.5	4.8	6.3	5.5	5.0	6.9	5.8	5.0	6.8	5.8	4.6	6.7	5.9	3.1	7.9	5.4	
Palmitoleico C 16.1	0.0	0.2	0.1	0.1	0.1	0.1	0.0	0.2	0.1	0.1	0.2	0.1	0.0	0.2	0.1	0.0	0.2	0.1	0.0	0.2	0.1	0.0	0.2	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.2	0.1	0.0	0.1	0.0	0.0	0.2	0.1		
Margarico C 17.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	
Margaroleico C 17.1	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.0
Estearico C 18.0	2.6	4.9	3.6	2.5	5.0	3.6	1.8	3.5	2.5	2.7	4.4	3.5	1.8	4.1	2.7	2.2	4.2	3.1	2.4	4.9	3.3	2.0	4.5	3.2	2.6	5.6	3.8	3.0	5.6	4.1	2.9	5.5	3.9	2.8	5.5	4.0	2.5	5.6	3.8	2.6	5.9	3.8	2.6	5.8	3.7	1.8	5.9	3.3	
Oléico C 18.1	28.9	54.1	42.8	27.7	57.9	43.7	24	45.6	35.7	28.1	48.6	40.4	21.7	50.3	31.1	18.5	32.6	24.4	19.6	36.2	28.4	21.1	43.9	30.7	17.7	35.5	24.7	18.1	31.7	24.3	18.4	31.9	23.7	18.1	31.4	23.5	17.7	28.9	22.4	17.3	29.1	22.8	16.1	29.5	22.3	16.1	57.9	27.9	
Líndeoico C 18.2	35.6	58.8	46.7	31.8	60.4	45.9	45.1	64.6	54.5	40.8	60.4	49.2	40.3	66.6	58.9	56.9	70.8	64.9	51.3	68.5	61.0	46.1	67.6	59	54.2	71.9	64.3	57.1	70.8	64.1	57.4	71.6	65.3	67.9	71.2	65.2	58.7	71.8	66.4	60.1	72.3	66.1	59.1	73.4	66.6	31.8	73.4	55.5	
Líndeoico C 18.3	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.3	0.1	0.0	0.2	0.1	0.0	0.3	0.1
Araquídico C 20.0	0.2	0.4	0.3	0.2	0.3	0.3	0.0	0.3	0.2	0.2	0.3	0.3	0.1	0.5	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.2	0.4	0.2	0.2	0.5	0.3	0.1	0.4	0.3	0.2	0.4	0.3	0.2	0.4	0.2	0.2	0.4	0.3	0.2	0.4	0.2	0.0	0.5	0.2	
Gadoléico C 20.1	0.0	0.2	0.2	0.0	0.2	0.2	0.0	0.3	0.2	0.2	0.4	0.2	0.1	0.3	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.1	0.3	0.2	0.1	0.4	0.2	0.1	0.2	0.2	0.1	0.3	0.2	0.0	0.2	0.1	0.0	0.4	0.2	
Bahénico C 22.0	0.4	1.1	0.7	0.6	1.1	0.8	0.5	0.8	0.6	0.6	0.9	0.7	0.4	1.0	0.6	0.5	0.8	0.5	0.5	0.8	0.6	0.4	0.8	0.6	0.5	0.9	0.7	0.5	0.9	0.7	0.6	1.0	0.7	0.7	1.2	0.8	0.6	1.0	0.7	0.6	1.0	0.7	0.6	0.9	0.7	0.4	1.2	0.5	
Lignocérico C 24.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.1	0.0	0.3	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.3	0.2	0.0	0.4	0.2	0.0	0.4	0.2	0.2	0.4	0.3	0.1	0.4	0.2	0.0	0.3	0.1	0.0	0.4	0.2	0.0	0.4	0.1
VALORES CALCULADOS																																																	
Índice de iodo (aceite)	107.8	126.1	117.0	104.3	127.9	116.5	116.6	132.4	124.5	111.8	128.2	119.4	112.3	135.3	128.1	125.8	138.3	132.8	119.3	136.5	129.4	117.1	136.0	128.0	123.7	139.2	132.0	124.2	137.2	131.2	126.1	139.1	132.9	126.6	138.5	132.4	126.0	139.5	133.5	127.3	139.4	133.4	126.6	140.3	133.8	104.3	140.3	128.3	
Índice de saponificación (aceite)	189.6	190.6	189.9	189.5	190.4	189.8	189.8	190.7	190.1	189.7	190.2	189.9	189.5	190.5	190.1	190.1	190.6	190.4	189.9	190.5	190.2	189.8	190.5	190.1	189.7	190.4	190.0	189.8	190.3	190.1	189.8	190.4	190.0	189.7	190.2	189.9	189.7	190.3	190.1	189.8	190.4	190.1	189.7	190.4	190.1	189.5	190.7	190.1	
Índice de iodo (triglicéridos)	108.6	127.2	117.9	105.2	128.9	117.5	117.6	133.5	125.5	112.7	129.2	120.3	113.2	136.4	129.2	126.8	139.4	133.8	120.3	137.6	130.4	118.0	137.1	129.1	124.7	140.3	133.1	125.2	138.3	132.2	127.1	140.2	134.0	127.6	139.7	133.5	127.0	140.6	134.6	128.3	140.5	134.5	127.6	141.5	134.9	105.2	141.5	129.4	
Índice de saponificación (triglicérid)	191.1	192.1	191.4	191.0	191.9	191.4	191.4	192.2	191.7	191.2	191.7	191.4	191.0	192.1	191.6	191.6	192.1	191.9	191.4	192.1	191.7	191.3	191.9	191.6	191.2	192.0	191.6	191.3	191.8	191.6	191.3	191.9	191.6	191.2	191.7	191.5	191.3	191.9	191.6	191.4	191.9	191.6	191.3	191.9	191.7	191.0	192.2	191.6	
Peso molecular medio (triglic)	876.9	881.5	879.9	877.8	881.9	880.3	876.5	880.2	878.8	878.6	881.0	880.1	877.1	881.8	879.0	876.7	879.2	877.9	877.1	880.1	878.5	877.7	880.5	878.9	877.5	881.0	879.4	878.2	880.6	879.3	877.9	880.7	879.4	878.8	881.3	879.9	878.0	880.8	879.2	878.0	880.3	879.0	877.8	880.7	878.9	876.5	881.9	879.2	
Nº dobles enlaces molécula promedio triglicéridos	3.8	4.4	4.1	3.7	4.5	4.1	4.1	4.6	4.3	3.9	4.5	4.2	3.9	4.7	4.5	4.4	4.8	4.6	4.2	4.8	4.5	4.1	4.7	4.5	4.3	4.9	4.6	4.3	4.8	4.6	4.4	4.9	4.6	4.4	4.8	4.6	4.4	4.9	4.7	4.4	4.9	4.7	4.4	4.9	4.7	3.7	4.9	4.5	
% Saturados	8.9	12.0	10.2	8.8	12.3	10.0	8.6	11.2	9.4	9.1	11.2	10.0	6.8	11.7	9.6	9.5	11.7	10.3	9.2	12.3	10.3	9.0	11.5	9.9	8.9	14.2	10.6	10.3	13.0	11.3	9.6	12.3	10.6	10.0	12.9	11.0	9.4	12.5	10.9	9.4	12.4	10.8	10.0	12.1	10.8	6.8	14.2	10.4	
% Insaturados	88.0	91.1	89.8	87.7	91.2	89.9	88.8	91.4	90.6	88.8	90.9	90.0	88.3	93.2	90.4	88.3	90.5	89.7	87.7	90.8	89.7	88.5	91.0	90.1	85.8	91.1	89.4	87.0	89.7	88.7	87.7	90.4	89.4	87.2	90.0	89.0	87.5	90.6	89.1	87.6	90.6	89.2	87.9	90.0	89.2	85.8	93.2	89.6	
% saturados / % insaturados	0.10	0.14	0.11	0.10	0.14	0.11	0.09	0.13	0.10	0.10	0.13	0.11	0.07	0.13	0.11	0.13	0.12	0.10	0.14	0.11	0.10	0.13	0.11	0.10	0.17	0.12	0.11	0.15	0.13	0.11	0.14	0.12	0.11	0.15	0.12	0.11	0.15	0.12	0.10	0.14	0.12	0.11	0.14	0.12	0.07	0.17	0.12		
% Palmítico / % Estearico	1.05	2.37	1.57	0.92	2.27	1.53	1.57	3.54	2.47	1.13	2.14	1.54	1.25	3.44	2.30	1.34	3.01	2.19	1.01	2.81	1.90	1.13	3.08	1.86	0.83	2.38	1.52	0.95	2.18	1.50	0.90	2.07	1.48	0.89	2.06	1.45	0.89	2.48	1.66	0.86	2.48	1.63	0.84	2.40	1.70	0.83	3.54	1.75	
% Oléico / % Líndeoico	0.49	1.52	0.95	0.46	1.82	1.02	0.37	1.01	0.67	0.47	1.19	0.85	0.33	1.25	0.56	0.26	0.57	0.38	0.29	0.70	0.47	0.32	0.95	0.54	0.25	0.66	0.39	0.26	0.55	0.38	0.26	0.56	0.37	0.26	0.54	0.37	0.25	0.49	0.34	0.24	0.48	0.35	0.22	0.49	0.34	0.22	1.82	0.53	
% Oléico + % Líndeoico	87.5	90.8	89.5	87.3	90.9	89.6	88.6	91.0	90.2	88.4	90.4	89.6	88.0	92.9	90.1	88.0	90.1	89.3	87.3	90.5	89.3	88.1	90.7	89.8	85.5	90.9	89.1	86.8	89.3	88.4	87.4	90.1	89.1	86.6	89.6	88.6	87.1	90.3	88.7	87.3	90.2	88.9	87.5	89.7	88.9	85.5	92.9	89.3	
Índice de refracción a 25°C	1.4702	1.4723	1.4713	1.4698	1.4725	1.4712	1.4712	1.4731	1.4721	1.4707	1.4726	1.4715	1.4707	1.4734</																																			

SEMILLAS DE GIRASOL - ENSAYOS DEL 01 AL 27

ENSAYO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	22	23	24	25	26	27	19	20	21	ROQUE SAENZ PEÑA						
Variedad	DK-3915			DK-4040			AGUARA			VDH -485			VDH -488			MG 2			CAROLINA			ACA 884			TRISOL 600									
Localidad	R S Peña			R S Peña			R.S. PEÑA			R.S. PEÑA			R.S. PEÑA			R.S. PEÑA			R.S. PEÑA			R.S. PEÑA			R.S. PEÑA			NORTE						
Ensayo	A-001	A-002	A-003	B-001	B-002	B-003	C-001	C-002	C-003	D-001	D-002	D-003	E-001	E-002	E-003	F-001	F-002	F-003	H-001	H-002	H-003	J-001	J-002	J-003	G-001	G-002	G-003							
	CROMATOGRAFIA ESTERES METILICOS DE LOS ACIDOS GRASOS																											Min	Máx	Prom				
Mirístico C14.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1				
Miristoleico C14.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0				
Palmitico C 16.0	5.2	4.9	5.4	5.4	5.3	5.5	4.6	6.0	5.2	7.5	7.4	7.0	5.0	4.7	4.6	4.8	5.1	4.8	5.5	5.7	5.8	5.7	6.1	6.0	3.7	3.7	3.7	4.6	7.5	5.5				
Palmitoleico C 16.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.2	0.1	0.1	0.1	0.1	0.2	0.0	0.2	0.1				
Margárico C 17.0	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0				
Margaroleico C 17.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.0	0.2	0.0				
Esteárico C 18.0	4.6	4.6	4.9	3.5	3.0	3.7	3.8	3.2	3.7	3.7	3.8	3.9	3.9	4.5	4.1	3.2	3.0	3.2	3.3	3.2	3.6	2.9	2.6	3.2	3.4	3.3	3.6	2.6	4.9	3.6				
Oléico C 18.1	45.0	44.5	44.0	54.1	44.0	42.8	48.5	41.2	46.7	30.1	30.6	28.9	46.7	49.0	50.3	49.5	46.8	50.4	41.9	36.7	37.0	39.1	39.5	40.3	86.0	85.5	88.0	28.9	54.1	42.8				
Linoleico C 18.2	43.6	44.2	44.0	35.6	46.1	46.3	41.8	48.4	43.3	57.4	57.0	58.8	43.0	40.3	39.7	41.2	44.1	40.2	48.1	53.0	52.3	50.9	51.0	49.3	5.4	5.7	2.6	35.6	58.8	46.7				
Linolenico C 18.3	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0				
Araquídico C 20.0	0.3	0.4	0.4	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.4	0.3				
Gadoléico C 20.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.2	0.3	0.3	0.3	0.0	0.2	0.2			
Behénico C 22.0	0.9	1.1	0.9	0.7	0.7	0.8	0.7	0.5	0.5	0.4	0.5	0.6	0.7	0.8	0.8	0.7	0.6	0.7	0.7	0.6	0.7	0.7	0.5	0.6	0.9	1.0	1.0	0.4	1.1	0.7				
Lignocérico C24:0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Suma de esteres metílicos	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0							
VALORES CALCULADOS																																		
																																Min	Máx	Prom
Índice de Iodo (aceite)	113.5	114.1	113.6	107.8	117.3	116.6	113.5	118.7	114.7	124.9	124.3	126.1	113.9	111.2	111.3	113.3	115.8	112.4	118.6	122.8	121.5	121.1	121.4	119.3	82.9	83.0	80.1	107.8	126.1	117.0				
Índice de saponific (aceite)	189.7	189.6	189.8	189.8	189.8	189.9	189.7	190.1	189.9	190.6	190.5	190.4	189.7	189.6	189.6	189.7	189.8	189.7	189.9	190.0	190.0	190.0	190.0	190.2	190.1	189.0	188.9	188.9	189.6	190.6	189.9			
Índice de Iodo (triglicéridos)	114.5	115.0	114.5	108.6	118.2	117.5	114.4	119.7	115.6	125.9	125.3	127.2	114.8	112.1	112.2	114.2	116.7	113.3	119.6	123.8	122.5	122.1	122.4	120.2	83.6	83.7	80.7	108.6	127.2	117.9				
Índice de saponific (triglicérid)	191.2	191.1	191.3	191.3	191.4	191.4	191.2	191.6	191.4	192.1	192.0	191.9	191.3	191.1	191.1	191.2	191.4	191.2	191.5	191.6	191.5	191.5	191.7	191.6	190.5	190.5	190.4	191.1	192.1	191.4				
Peso molecular medio (triglic)	880.9	881.5	880.7	880.5	880.1	880.1	881.0	879.0	880.0	876.9	877.2	877.7	880.7	881.3	881.3	880.9	880.2	880.9	879.8	879.2	879.5	879.5	878.5	879.2	884.2	884.4	884.5	876.9	881.5	879.9				
Nº dobles enlaces molécula promedio triglicéridos	4.0	4.0	4.0	3.8	4.1	4.1	4.0	4.1	4.0	4.3	4.3	4.4	4.0	3.9	3.9	4.0	4.0	3.9	4.1	4.3	4.2	4.2	4.2	4.2	2.9	2.9	2.8	3.8	4.4	4.1				
%Saturados	11.1	11.1	11.6	9.9	9.4	10.4	9.4	10.0	9.6	11.9	12.0	11.9	10.0	10.4	9.7	9.0	8.9	9.1	9.7	9.9	10.5	9.6	9.3	10.1	8.2	8.4	8.8	8.9	12.0	10.2				
% Insaturados	88.9	88.9	88.4	90.1	90.6	89.6	90.6	90.0	90.4	88.1	88.0	88.1	90.0	89.6	90.3	91.0	91.1	90.9	90.3	90.1	89.5	90.4	90.7	89.9	91.8	91.6	91.3	88.0	91.1	89.8				
% saturados / % insaturados	0.12	0.12	0.13	0.11	0.10	0.12	0.10	0.11	0.11	0.14	0.14	0.13	0.11	0.12	0.11	0.10	0.10	0.10	0.11	0.11	0.12	0.11	0.10	0.11	0.09	0.09	0.10	0.10	0.14	0.11				
% Palmítico / % Esteárico	1.12	1.08	1.10	1.56	1.76	1.49	1.18	1.87	1.40	2.03	1.95	1.78	1.28	1.05	1.12	1.50	1.72	1.48	1.68	1.80	1.59	1.95	2.37	1.91	1.09	1.12	1.02	1.05	2.37	1.57				
% Oleico / % Linoleico	1.03	1.01	1.00	1.52	0.95	0.92	1.16	0.85	1.08	0.52	0.54	0.49	1.09	1.22	1.27	1.20	1.06	1.25	0.87	0.69	0.71	0.77	0.78	0.82	16.01	15.14	34.26	0.49	1.52	0.95				
% Oleico + % Linoleico	88.6	88.7	88.0	89.7	90.1	89.1	90.2	89.7	90.0	87.5	87.6	87.7	89.7	89.3	90.0	90.7	90.8	90.6	90.0	89.7	89.2	90.1	90.5	89.5	91.3	91.2	90.6	87.5	90.8	89.5				

SEMILLAS DE GIRASOL - ENSAYO 28 AL 54

ENSAYO	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54						
Variedad	DK-4040			AGUARA			VDH 485			VDH 488			MG-2			PARAISO 20			ACA 884			SPS 3102			TRISOL 600			LAS BREÑAS					
Localidad	LAS BREÑAS			LAS BREÑAS			LAS BREÑAS			LAS BREÑAS			LAS BREÑAS			LAS BREÑAS			LAS BREÑAS			LAS BREÑAS			LAS BREÑAS			LAS BREÑAS			NORTE		
Ensayo	B-004	B-005	B-006	C-004	C-005	C-006	D-004	D-005	D-006	E-004	E-005	E-006	F-00.4	F-005	F-006	I-004	I-005	I-006	J-004	J-005	J-006	L-004	L-005	L-006	G-004	G-005	G006						
CROMATOGRAFIA ESTERES METILICOS DE LOS ACIDOS GRASOS																												MÍN	MÁX	PROM			
Mirístico C14.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1				0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1			
Miristoleico C14.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Palmitico C 16.0	4.7	4.8	5.0	4.9	5.0	4.7	6.8	6.7	7.0	4.7	4.7	4.8	5.0	5.3	4.7	5.5	5.7	5.6				5.5	5.2	5.3	3.9	3.8	3.8	4.7	7.0	5.3			
Palmitoleico C 16.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1				0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1			
Margárico C 17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0			
Margaroleico C 17.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1				0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0			
Estearico C 18.0	4.1	3.8	3.7	3.5	3.1	3.7	4.2	3.8	3.5	5.0	4.3	4.5	3.6	3.8	3.3	2.8	3.4	2.5				3.1	2.7	3.2	3.3	3.5	3.4	2.5	5.0	3.6			
Oléico C 18.1	57.1	57.9	57.3	42.9	41.5	43.3	28.3	29.1	27.7	48.9	46.1	43.5	48.0	44.5	52.8	36.8	35.9	36.4				45.9	48.7	45.2	86.1	84.6	84.7	27.7	57.9	43.7			
Linoleico C 18.2	32.7	31.8	32.4	47.5	49.2	47.0	59.1	59.1	60.4	39.8	43.3	45.5	41.8	45.0	37.9	53.4	53.5	54.1				43.9	42.2	44.9	5.1	6.2	6.3	31.8	60.4	45.9			
Linolenico C 18.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1				0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.1	0.0			
Araquídico C 20.0	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2				0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.3	0.3			
Gadoleico C 20.1	0.2	0.2	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2				0.2	0.2	0.2	0.3	0.3	0.3	0.0	0.2	0.2			
Behénico C 22.0	0.8	1.0	1.1	0.6	0.7	0.8	0.8	0.7	0.7	0.8	0.8	0.9	0.7	0.7	0.7	0.7	0.7	0.6				1.0	0.6	0.8	0.9	0.9	0.9	0.6	1.1	0.8			
Lignocérico C24:0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Suma de esteres metílicos	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0				100.0	100.0	100.0	100.0	100.0	100.0						
VALORES CALCULADOS																													MÍN	MÁX	PROM		
Índice de Iodo (aceite)	105.0	104.3	104.6	118.5	120.1	117.8	126.0	126.7	127.9	110.5	114.1	115.7	113.3	115.7	110.3	123.6	123.1	124.6				114.9	114.3	115.9	82.5	83.7	83.7	104.3	127.9	116.5			
Índice de saponific (aceite)	189.5	189.5	189.5	189.8	189.8	189.7	190.3	190.3	190.4	189.6	189.7	189.7	189.7	189.8	189.6	190.0	190.0	190.0				189.8	189.9	189.8	189.0	189.0	189.0	189.5	190.4	189.8			
Índice de Iodo (triglicéridos)	105.9	105.2	105.5	119.4	121.0	118.7	127.0	127.7	128.9	111.4	115.0	116.6	114.2	116.6	111.2	124.6	124.1	125.6				115.8	115.2	116.9	83.2	84.4	84.4	105.2	128.9	117.5			
Índice de saponific (triglicérid)	191.0	191.0	191.0	191.3	191.4	191.2	191.8	191.8	191.9	191.1	191.2	191.2	191.2	191.3	191.1	191.5	191.5	191.6				191.3	191.4	191.3	190.5	190.5	190.5	191.0	191.9	191.4			
Peso molecular medio (triglic)	881.8	881.9	881.7	880.2	880.2	880.8	878.4	878.2	877.8	881.4	881.0	881.0	880.7	880.3	881.2	879.5	879.4	879.2				880.6	880.1	880.4	884.2	884.1	884.2	877.8	881.9	880.3			
N° dobles enlaces molécula promedio trialiceridos	3.7	3.7	3.7	4.1	4.2	4.1	4.4	4.4	4.5	3.9	4.0	4.0	4.0	4.0	3.9	4.3	4.3	4.4				4.0	4.0	4.1	2.9	2.9	2.9	3.7	4.5	4.1			
%Saturados	10.0	10.0	10.2	9.3	9.1	9.5	12.3	11.5	11.5	10.9	10.3	10.6	9.8	10.2	9.1	9.4	10.2	9.0				9.8	8.8	9.6	8.4	8.6	8.5	8.8	12.3	10.0			
% Insaturados	90.0	90.0	89.8	90.7	90.9	90.5	87.7	88.5	88.5	89.1	89.7	89.4	90.2	89.8	90.9	90.6	89.8	91.0				90.2	91.2	90.4	91.7	91.5	91.5	87.7	91.2	89.9			
% saturados / % insaturados	0.11	0.11	0.11	0.10	0.10	0.11	0.14	0.13	0.13	0.12	0.11	0.12	0.11	0.11	0.10	0.10	0.11	0.10				0.11	0.10	0.11	0.09	0.09	0.09	0.10	0.14	0.11			
% Palmitico / % Estearico	1.16	1.26	1.35	1.40	1.58	1.29	1.60	1.78	2.01	0.92	1.10	1.07	1.38	1.37	1.45	1.95	1.71	2.27				1.76	1.97	1.63	1.18	1.10	1.11	0.92	2.27	1.53			
% Oleico / % Linoleico	1.75	1.82	1.77	0.90	0.84	0.92	0.48	0.49	0.46	1.23	1.06	0.96	1.15	0.99	1.39	0.69	0.67	0.67				1.05	1.15	1.01	17.02	13.67	13.40	0.46	1.82	1.02			
% Oleico + % Linoleico	89.7	89.7	89.7	90.4	90.6	90.2	87.3	88.2	88.1	88.8	89.3	89.0	89.8	89.5	90.6	90.1	89.4	90.6				89.8	90.9	90.1	91.2	90.8	91.0	87.3	90.9	89.6			

SEMILLA DE GIRASOL - ENSAYO 55 AL 87

ENSAYO	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87					
Variedad	DK-3915			DK-4040			AGUARÁ			VDH-485			VDH-488			MG-2			CAROLINA			PARAISO 20			ACA 884			ACA 885			TRISOL 600			RECONQUISTA				
Localidad	RECONQUISTA			RECONQUISTA			RECONQUISTA			RECONQUISTA			RECONQUISTA			RECONQUISTA			RECONQUISTA			RECONQUISTA			RECONQUISTA			RECONQUISTA			RECONQUISTA			NORTE				
Ensayo	A-007	A-008	A-009	B-007	B-008	B-009	C-007	C-008	C-009	D-007	D-008	D-009	E-007	E-008	E-009	F-007	F-008	F-009	H-007	H-008	H-009	I-007	I-008	I-009	J-007	J-008	J-009	K-007	K-008	K-009	G-007	G-008	G-009					
CROMATOGRAFIA ESTERES METILICOS DE LOS ACIDOS GRASOS																															Min	Máx	Prom					
Mirístico C14.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	
Miristoleico C14.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Palmitico C 16.0	5.5	6.3	5.9	5.6	5.5	5.9	5.2	5.1	5.2	7.3	7.6	7.7	5.6	5.7	5.7	5.5	5.5	5.6	5.7	6.2	6.1	6.4	6.1	6.0	5.9	6.0	6.5	6.4	6.3	6.0	3.7	3.7	3.4	5.1	7.7	6.0		
Palmitoleico C 16.1	0.1	0.2	0.1	0.2	0.2	0.2	0.0	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.2	0.1	
Margárico C 17.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Margaroleico C 17.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Esteárico C 18.0	3.5	3.2	3.1	2.4	2.7	2.3	3.1	3.1	3.2	2.7	2.8	2.7	2.9	3.3	3.0	2.3	2.3	2.3	2.5	2.3	2.1	1.9	2.1	2.1	2.1	2.2	1.8	1.9	1.9	2.0	2.3	2.5	2.5	1.8	3.5	2.5		
Oléico C 18.1	43.3	34.4	37.8	45.6	45.3	43.2	43.6	42.9	38.8	26.8	24.2	24.0	39.0	36.1	37.9	40.7	39.0	39.8	33.2	26.5	27.8	31.0	31.6	32.3	36.8	36.7	30.8	33.0	34.1	34.9	88.1	87.9	88.6	24.0	45.6	35.7		
Linoleico C 18.2	46.4	54.7	51.8	45.1	45.2	47.3	47.0	47.4	51.5	62.0	64.4	64.6	51.2	53.3	52.0	50.3	51.7	50.8	57.4	63.8	62.9	59.5	59.2	58.6	54.1	53.9	59.7	57.4	56.4	55.9	4.5	4.3	4.0	45.1	64.6	54.5		
Linolenico C 18.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Araquídico C 20.0	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.2	0.3	0.3	0.0	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.0	0.3	0.2
Gadoleico C 20.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.0	0.3	0.2
Behénico C 22.0	0.7	0.7	0.8	0.6	0.6	0.6	0.6	0.7	0.7	0.5	0.6	0.6	0.6	0.7	0.7	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.7	0.8	0.8	0.5	0.8	0.6	
Lignocerico C24:0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Suma de esterios metilicos	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
VALORES CALCULADOS																													Min	Máx	Prom							
Indice de Iodo (aceite)	116.9	123.7	121.5	116.7	116.6	118.5	118.1	118.3	121.8	129.6	131.4	131.8	121.8	123.1	122.2	121.6	122.7	122.0	127.2	132.4	132.0	129.0	128.9	128.4	124.6	124.2	129.3	127.2	126.4	126.1	83.3	82.8	82.7	116.6	132.4	124.5		
Indice de saponific (aceite)	189.9	190.1	190.0	190.0	189.9	190.0	189.8	189.8	189.9	190.5	190.6	190.7	190.0	190.0	190.0	190.0	190.0	190.0	190.1	190.3	190.2	190.3	190.2	190.3	190.2	190.2	190.4	190.3	190.3	190.2	189.1	189.0	188.9	189.8	190.7	190.1		
Indice de Iodo (triglicéridos)	117.8	124.6	122.5	117.6	117.6	119.4	119.0	119.3	122.8	130.7	132.5	132.9	122.7	124.1	123.2	122.6	123.7	123.0	128.2	133.5	133.0	130.0	129.9	129.4	125.6	125.2	130.3	128.3	127.5	127.2	84.0	83.4	83.4	117.6	133.5	125.5		
Indice de saponific (triglicérid)	191.4	191.7	191.5	191.5	191.4	191.6	191.4	191.4	191.4	192.0	192.1	192.2	191.5	191.5	191.6	191.6	191.6	191.5	191.6	191.8	191.8	191.9	191.7	191.7	191.7	191.7	191.7	191.9	191.8	191.8	191.7	190.5	190.5	190.4	191.4	192.2	191.7	
Peso molecular medio (triglic)	880.1	878.8	879.4	879.6	879.8	879.3	880.1	880.2	880.0	877.2	876.7	876.5	879.4	879.4	879.3	879.2	879.2	879.4	879.0	878.2	878.3	877.9	878.4	878.4	878.7	878.7	877.8	878.2	878.1	878.4	883.9	884.1	884.5	876.5	880.2	878.8		
N° dobles enlaces molécula promedio triglicéridos	4.1	4.3	4.2	4.1	4.1	4.1	4.1	4.1	4.3	4.5	4.6	4.6	4.3	4.3	4.3	4.2	4.3	4.3	4.4	4.6	4.6	4.5	4.5	4.5	4.3	4.3	4.5	4.4	4.4	4.4	2.9	2.9	2.9	4.1	4.6	4.3		
%Saturados	10.0	10.6	10.1	8.9	9.1	9.1	9.2	9.3	9.4	10.9	11.2	11.0	9.4	10.1	9.6	8.6	8.7	8.8	9.1	9.5	9.1	9.1	9.0	8.9	8.8	9.1	9.1	9.2	9.0	8.8	6.9	7.3	7.1	8.6	11.2	9.4		
% Insaturados	90.0	89.4	89.9	91.1	90.9	90.9	90.8	90.7	90.6	89.1	88.8	89.0	90.6	89.9	90.4	91.4	91.3	91.2	90.9	90.6	91.0	90.9	91.0	91.1	91.2	91.0	90.9	90.8	91.0	91.2	93.1	92.7	93.0	88.8	91.4	90.6		
% saturados / % insaturados	0.11	0.12	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.12	0.13	0.12	0.10	0.11	0.11	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.07	0.08	0.08	0.09	0.13	0.10			
% Palmítico / % Esteárico	1.57	1.96	1.92	2.30	2.03	2.52	1.68	1.64	1.66	2.67	2.73	2.80	1.95	1.75	1.92	2.38	2.38	2.41	2.31	2.68	2.91	3.35	2.89	2.84	2.82	2.74	3.54	3.37	3.30	3.02	1.63	1.48	1.35	1.57	3.54	2.47		
% Oleico / % Linoleico	0.93	0.63	0.73	1.01	1.00	0.91	0.93	0.91	0.75	0.43	0.38	0.37	0.76	0.68	0.73	0.81	0.75	0.78	0.58	0.42	0.44	0.52	0.53	0.55	0.68	0.68	0.52	0.57	0.60	0.62	19.39	20.39	22.10	0.37	1.01	0.67		
% Oleico + % Linoleico	89.7	89.0	89.6	90.7	90.5	90.6	90.6	90.3	90.3	88.8	88.6	88.6	90.3	89.4	89.9	91.0	90.7	90.6	90.7	90.3	90.7	90.5	90.8	90.9	90.8	90.6	90.5	90.4	90.4	90.8	92.6	92.2	92.7	88.6	91.0	90.2		

SEMILLAS DE GIRASOL- ENSAYOS 88 AL 108

ENSAYO	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108			
Variiedad	DK-4040			AGUARÁ			VDH-485			VDH-488			MG-2			CAROLINA			TRISOL 600			RAFAELA		
Localidad	RAFAELA			RAFAELA			RAFAELA			RAFAELA			RAFAELA			RAFAELA			RAFAELA			NORTE		
Ensayo	B-010	B-011	B-012	C-011	C-011	C-012	D-010	D-011	D-012	E-010	E-011	E-012	F-010	F-011	F-012	H-010	H-011	H-012	G-010	G-011	G-012			
	CROMATOGRAFIA ESTERES METILICOS DE LOS ACIDOS GRASOS																					Min	Máx	Prom
Mirístico C14.0	0.1	0.1	0.1	0.1	0.0		0.1	0.1	0.1	0.1	0.1		0.1	0.1	0.1	0.1			0.1	0.1	0.1	0.0	0.1	0.1
Miristoleico C14.1	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
Palmitico C 16.0	5.1	5.3	5.2	5.2	5.1		5.9	6.5	6.4	5.0	4.9		5.0	4.9	4.9	5.4			3.9	4.9	4.8	4.9	6.5	5.3
Palmitoleico C 16.1	0.1	0.1	0.1	0.1	0.1		0.2	0.1	0.1	0.1	0.1		0.1	0.1	0.1	0.1			0.2	0.2	0.2	0.1	0.2	0.1
Margárico C 17.0	0.0	0.0	0.0	0.1	0.1		0.1	0.1	0.1	0.1	0.1		0.0	0.0	0.0	0.1			0.0	0.1	0.0	0.0	0.1	0.0
Margaroleico C 17.1	0.0	0.0	0.0	0.0	0.0		0.2	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.1			0.0	0.1	0.1	0.0	0.2	0.0
Estearico C 18.0	3.9	3.8	3.8	3.3	3.5		2.7	3.4	3.5	4.3	4.4		3.3	3.2	3.1	3.3			3.2	2.8	2.8	2.7	4.4	3.5
Oléico C 18.1	48.6	45.0	46.8	36.5	35.9		35.6	28.3	28.1	42.6	43.8		45.9	44.8	45.8	37.5			84.4	67.7*	67.6*	28.1	48.6	40.4
Linoleico C 18.2	40.8	44.3	42.7	53.6	54.1		54.2	60.1	60.4	46.6	45.2		44.3	45.6	44.6	52.2			7.0	22.9	23.0	40.8	60.4	49.2
Linolenico C 18.3	0.0	0.1	0.0	0.0	0.0		0.1	0.1	0.1	0.0	0.1		0.1	0.1	0.1	0.1			0.0	0.1	0.0	0.0	0.1	0.0
Araquídico C 20.0	0.3	0.3	0.3	0.3	0.3		0.2	0.3	0.3	0.3	0.3		0.2	0.2	0.3	0.3			0.3	0.3	0.2	0.2	0.3	0.3
Gadoleico C 20.1	0.2	0.2	0.2	0.2	0.2		0.2	0.2	0.2	0.2	0.2		0.2	0.2	0.3	0.4			0.2	0.3	0.2	0.2	0.4	0.2
Behénico C 22.0	0.9	0.8	0.8	0.7	0.7		0.6	0.7	0.7	0.8	0.8		0.7	0.7	0.7	0.6			0.8	0.8	1.1	0.6	0.9	0.7
Lignocérico C24:0	0.0	0.0	0.0	0.0	0.0		0.1	0.2	0.2	0.0	0.1		0.0	0.0	0.2	0.0			0.0	0.0	0.0	0.0	0.2	0.1
Suma de esteres metílicos	100.0	100.0	100.0	100.0	100.0		100.0	100.0	100.0	100.0	100.0		100.0	100.0	100.0	100.0			100.0	100.0	100.0			
VALORES CALCULADOS																						Min	Máx	Prom
Índice de Iodo (aceite)	111.8	114.9	113.6	123.5	123.9		124.1	127.9	128.2	116.7	115.4		115.7	117.1	116.1	122.2			84.4	97.6	97.5	111.8	128.2	119.4
Índice de saponific (aceite)	189.7	189.8	189.7	189.9	189.9		190.1	190.2	190.2	189.7	189.7		189.8	189.7	189.7	189.9			189.1	189.5	189.4	189.7	190.2	189.9
Índice de Iodo (triglicéridos)	112.7	115.9	114.5	124.4	124.9		125.1	128.9	129.2	117.6	116.4		116.7	118.1	117.1	123.2			85.0	98.4	98.3	112.7	129.2	120.3
Índice de saponific (triglicéridos)	191.2	191.3	191.3	191.5	191.4		191.6	191.7	191.7	191.3	191.2		191.3	191.3	191.2	191.5			190.6	191.0	190.9	191.2	191.7	191.4
Peso molecular medio (triglic)	881.0	880.4	880.7	879.8	879.9		879.1	878.6	878.8	880.6	880.9		880.4	880.4	881.0	879.7			883.7	882.0	882.5	878.6	881.0	880.1
N° dobles enlaces molécula promedio triglicéridos	3.9	4.0	4.0	4.3	4.3		4.3	4.5	4.5	4.1	4.0		4.0	4.1	4.1	4.3			3.0	3.4	3.4	3.9	4.5	4.2
%Saturados	10.3	10.3	10.1	9.6	9.7		9.6	11.2	11.1	10.5	10.6		9.4	9.1	9.2	9.7			8.2	8.9	9.0	9.1	11.2	10.0
% Insaturados	89.7	89.7	89.9	90.4	90.3		90.4	88.8	88.9	89.5	89.4		90.6	90.9	90.8	90.3			91.8	91.1	91.0	88.8	90.9	90.0
% saturados / % insaturados	0.11	0.11	0.11	0.11	0.11		0.11	0.13	0.12	0.12	0.12		0.10	0.10	0.10	0.11			0.09	0.10	0.10	0.10	0.13	0.11
% Palmítico / % Estearico	1.31	1.42	1.38	1.56	1.44		2.14	1.91	1.85	1.16	1.13		1.50	1.53	1.57	1.66			1.21	1.75	1.69	1.13	2.14	1.54
% Oleico / % Linoleico	1.19	1.02	1.10	0.68	0.66		0.66	0.47	0.47	0.91	0.97		1.03	0.98	1.03	0.72			12.07	2.96	2.94	0.47	1.19	0.85
% Oleico + % Linoleico	89.4	89.3	89.6	90.0	90.0		89.8	88.4	88.6	89.2	89.0		90.2	90.4	90.4	89.7			91.4	90.5	90.5	88.4	90.4	89.6

Nota:

(*) Este dato no cumple con la normativa IRAM para un Aceite de Girasol de "alto oleico". Se lo ha considerado anómalo y por lo tanto desechable. Se estima que proviene de una fecundación anormal, o bien de una indeseada contaminación de las semillas durante su siembra o en el momento de la cosecha.

SEMILLAS DE GIRASOL- ENSAYOS 109 AL 132

ENSAYO	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132					
Variedad	DK-3915			DK-4040			VDH-485			MG-2			PARAISO 20			ACA 884			ACA 885			TRISOL 600			PARANA				
Localidad	PARANA			PARANA			PARANA			PARANA			PARANA			PARANA			PARANA			PARANA			CENTRO				
Ensayo	A-013	A-014	A-015	B-013	B-014	B-015	D-013	D-014	D-015	F-013	F-014	F-015	I-013	I-014	I-015	J-013	J-014	J-015	K-013	K-014	K-015	G-013	G-014	G-015					
ROMATOGRAFIA ESTERES METILICOS DE LOS ACIDOS GRASOS																										Min	Máx	Prom	
Mirístico C14.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1		
Miristoleico C14.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	
Palmitico C 16.0	5.8	5.6	5.9	5.2	5.2	4.9	7.2	7.5	7.5	5.4	5.6	5.1	6.2	6.1	6.2	5.8	5.9	3.1	6.1	6.6	6.3	3.6	3.4	3.4	3.1	7.5	5.9		
Palmitoleico C 16,1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.2	0.1		
Margárico C 17.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0		
Margaroleico C 17.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	
Esteárico C 18.0	3.8	4.1	3.6	3.2	3.4	3.0	3.3	3.2	3.0	2.3	2.3	2.8	1.8	2.1	2.1	2.2	2.3	2.5	1.9	1.9	2.1	2.5	2.8	2.7	1.8	4.1	2.7		
Oléico C 18,1	34.4	35.2	32.8	47.1	38.8	50.3	22.6	22.8	21.7	36.4	36.5	36.1	24.4	23.8	23.8	30.9	27.7	33.9	25.2	23.4	25.9	84.2	84.6	85.5	21.7	50.3	31.1		
Linoleico C 18.2	54.5	53.6	56.3	43.2	51.3	40.3	65.4	65.3	66.3	54.9	54.5	55.0	66.2	66.6	66.6	59.7	63.0	59.0	65.2	66.6	64.3	7.9	7.6	6.6	40.3	66.6	58.9		
Linolenico C 18,3	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.0		
Araquídico C 20.0	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.5	0.2	0.3	0.3	0.3	0.1	0.5	0.2		
Gadoleico C 20,1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.3	0.5	0.1	0.3	0.2		
Behénico C 22.0	0.8	0.8	0.9	0.8	0.8	1.0	0.6	0.6	0.5	0.6	0.6	0.6	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.4	0.5	0.8	0.8	0.7	0.4	1.0	0.6		
Lignocérico C24:0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.1		
Suma de esteres metílicos	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0					
VALORES CALCULADOS																											Min	Máx	Prom
Índice de Iodo (aceite)	123.2	122.3	124.8	114.5	121.4	112.3	132.1	131.7	132.9	125.5	125.0	125.3	135.1	135.2	135.3	129.4	132.0	130.5	134.1	134.7	133.1	86.3	85.8	85.0	112.3	135.3	128.1		
Índice de saponific (aceite)	189.9	189.9	190.0	189.7	189.8	189.6	190.4	190.5	190.5	190.0	190.1	189.9	190.4	190.3	190.3	190.1	190.1	189.5	190.2	190.3	190.3	189.0	189.0	189.0	189.5	190.5	190.1		
Índice de Iodo (triglicéridos)	124.2	123.3	125.9	115.4	122.4	113.2	133.2	132.8	134.0	126.6	126.0	126.4	136.2	136.3	136.4	130.4	133.1	131.6	135.2	135.8	134.1	87.0	86.5	85.7	113.2	136.4	129.2		
Índice de saponific (triglicérid)	191.5	191.5	191.5	191.3	191.4	191.1	192.0	192.0	192.1	191.6	191.6	191.5	191.9	191.8	191.8	191.6	191.7	191.0	191.8	191.8	191.8	190.5	190.5	190.5	191.0	192.1	191.6		
Peso molecular medio (triglic)	879.8	879.7	879.4	880.7	880.2	881.4	877.6	877.2	877.1	879.2	879.1	879.7	877.7	878.1	878.0	879.1	878.8	881.8	878.6	878.4	878.3	883.9	884.1	884.3	877.1	881.8	879.0		
N° dobles enlaces molécula promedio triglicéridos	4.3	4.3	4.4	4.0	4.2	3.9	4.6	4.6	4.6	4.4	4.4	4.4	4.7	4.7	4.7	4.5	4.6	4.6	4.7	4.7	4.6	3.0	3.0	3.0	3.9	4.7	4.5		
%Saturados	10.9	11.0	10.7	9.5	9.7	9.2	11.6	11.7	11.6	8.5	8.7	8.8	8.9	9.2	9.1	9.0	9.1	6.8	9.1	9.8	9.4	7.2	7.3	7.1	6.8	11.7	9.6		
% Insaturados	89.1	89.1	89.3	90.5	90.3	90.8	88.4	88.3	88.4	91.5	91.3	91.3	91.1	90.8	90.9	91.0	90.9	93.2	90.9	90.2	90.6	92.8	92.7	92.9	88.3	93.2	90.4		
% saturados / % insaturados	0.12	0.12	0.12	0.11	0.11	0.10	0.13	0.13	0.13	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.07	0.10	0.11	0.10	0.08	0.08	0.08	0.07	0.13	0.11		
% Palmítico / % Esteárico	1.52	1.39	1.66	1.62	1.56	1.62	2.21	2.32	2.51	2.40	2.42	1.83	3.44	2.85	3.00	2.59	2.56	1.25	3.14	3.42	2.98	1.45	1.24	1.28	1.25	3.44	2.30		
% Oleico / % Linoleico	0.63	0.66	0.58	1.09	0.75	1.25	0.35	0.35	0.33	0.66	0.67	0.66	0.37	0.36	0.36	0.52	0.44	0.57	0.39	0.35	0.40	10.67	11.17	12.92	0.33	1.25	0.56		
% Oleico + % Linoleico	88.9	88.8	89.1	90.3	90.1	90.6	88.1	88.0	88.0	91.3	91.1	91.1	90.6	90.4	90.5	90.7	90.7	92.9	90.4	89.9	90.2	92.1	92.2	92.1	88.0	92.9	90.1		

SEMILLAS DE GIRASOL - ENSAYOS DEL 133 AL 165

ENSAYO	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165						
Variedad	DK-3915			DK-4040			VDH-485			VDH-488			MG-2			CAROLINA			PARAISO 20			ACA 884			ACA 885			SPS 3102			TRISOL 600			MANFREDI 1					
Localidad	MANFREDI 1			MANFREDI 1			MANFREDI 1			MANFREDI 1			MANFREDI 1			MANFREDI 1			MANFREDI 1			MANFREDI 1			MANFREDI 1			MANFREDI 1			CENTRO								
Ensayo	A-016	A-017	A-018	B-016	B-017	B-018	D-016	D-017	D-018	E-016	E-017	E-018	F-016	F-017	F-019	H-016	H-017	H-018	I-016	I-017	I-018	J-016	J-017	J-018	K-016	K-017	K-018	L-016	L-017	L-018	G-016	G-018	G-019						
CROMATOGRAFIA ESTERES METILICOS DE LOS ACIDOS GRASOS																														Min	Máx	Prom							
Mirístico C14,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,0	0,0	0,0	0,1	0,1	0,1			
Miristoleico C14,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0		
Palmitico C 16,0	6,3	6,3	6,2	6,1	5,7	5,8	7,4	7,3	7,4	5,5	5,9	5,8	5,7	5,6	5,6	6,3	6,2	6,6	6,7	6,7	6,5	6,6	6,7	6,4	6,8	6,8	6,7	6,5	6,7	6,5	3,6	3,6	3,5	5,5	7,4	6,4			
Palmitoleico C 16,1	0,1	0,1	0,1	0,1	0,1	0,0	0,0	0,0	0,1	0,0	0,2	0,0	0,1	0,1	0,1	0,1	0,1	0,2	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,0	0,2	0,1	
Margárico C 17,0	0,0	0,1	0,1	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,0	0,0	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,1	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0		
Margaroleico C 17,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,0	0,0		
Estearico C 18,0	4,2	3,7	4,1	3,6	3,4	3,4	3,0	3,0	3,0	4,1	3,8	4,1	3,2	3,3	3,3	3,2	3,2	3,2	2,3	2,2	2,3	2,6	2,5	2,7	2,4	2,3	2,5	2,5	2,3	2,5	3,1	3,0	3,1	2,2	4,2	3,1			
Oléico C 18,1	26,5	24,7	26,5	31,0	31,5	32,6	18,5	18,8	19,0	28,6	28,4	28,8	28,5	30,5	30,3	23,8	23,1	21,8	20,0	19,3	20,0	22,7	21,9	24,8	19,5	18,9	19,7	24,1	23,8	24,1	82,7	83,6	83,7	18,5	32,6	24,4			
Linoleico C 18,2	61,5	63,8	61,7	58,2	58,2	56,9	69,9	69,7	69,5	60,5	60,6	60,0	61,3	59,3	59,5	65,6	66,4	67,1	69,8	70,6	70,1	66,9	67,8	65,0	70,2	70,8	69,7	65,7	66,2	66,0	9,1	8,2	8,0	56,9	70,8	64,9			
Linolenico C 18,3	0,1	0,1	0,1	0,0	0,1	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,0	0,1	0,1		
Araquídico C 20,0	0,3	0,3	0,3	0,2	0,2	0,3	0,2	0,2	0,2	0,3	0,3	0,3	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,2	0,3	0,2			
Gadoléico C 20,1	0,2	0,2	0,2	0,2	0,2	0,2	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,1	0,2	0,2			
Behénico C 22,0	0,8	0,7	0,8	0,7	0,6	0,7	0,6	0,5	0,6	0,7	0,7	0,7	0,6	0,6	0,6	0,5	0,5	0,6	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,8	0,8	0,9	0,5	0,8	0,6	
Lignocérico C24:0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0		
Suma de esteres metilicos	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0			
VALORES CALCULADOS																																					Min	Máx	Prom
Índice de Iodo (aceite)	128,6	131,1	128,9	126,5	127,1	125,8	136,2	136,1	135,9	128,7	128,8	128,0	129,9	128,3	128,5	133,3	134,1	134,4	137,4	138,2	138,0	134,9	135,5	133,2	137,7	138,3	137,1	133,9	134,4	134,2	86,6	85,8	85,6	125,8	138,3	132,8			
Índice de saponific (aceite)	190,2	190,3	190,2	190,1	190,1	190,1	190,6	190,6	190,6	190,1	190,2	190,1	190,2	190,1	190,1	190,3	190,3	190,4	190,5	190,5	190,5	190,5	190,5	190,5	190,6	190,6	190,5	190,4	190,5	190,4	189,0	189,0	188,9	190,1	190,6	190,4			
Índice de Iodo (triglicéridos)	129,6	132,1	130,0	127,6	128,1	126,8	137,3	137,2	137,0	129,7	129,8	129,0	131,0	129,3	129,5	134,4	135,2	135,5	138,5	139,3	139,1	136,0	136,6	134,2	138,8	139,4	138,2	135,0	135,5	135,3	87,3	86,5	86,3	126,8	139,4	133,8			
Índice de saponific (triglicérid)	191,7	191,8	191,7	191,7	191,6	191,6	192,1	192,1	192,1	191,6	191,7	191,6	191,7	191,7	191,6	191,9	191,9	192,0	192,1	192,1	192,0	192,0	192,0	191,9	192,1	192,1	192,0	192,0	192,0	190,5	190,5	190,5	191,6	192,1	191,9				
Peso molecular medio (triglic)	878,6	878,4	878,8	878,7	879,0	879,1	876,7	876,7	876,7	879,2	878,7	878,9	878,7	878,9	878,9	877,8	877,9	877,5	877,0	877,0	877,1	877,2	877,2	877,7	877,0	876,9	877,3	877,5	877,3	877,5	883,9	884,1	884,2	876,7	879,2	877,9			
N° dobles enlaces molécula promedio triglicéridos	4,5	4,6	4,5	4,4	4,4	4,4	4,7	4,7	4,7	4,5	4,5	4,5	4,5	4,5	4,5	4,6	4,7	4,7	4,8	4,8	4,8	4,7	4,7	4,6	4,8	4,8	4,8	4,7	4,7	3,0	3,0	3,0	4,4	4,8	4,6				
%Saturados	11,7	11,2	11,5	10,6	10,1	10,3	11,4	11,2	11,3	10,6	10,6	11,0	9,9	9,8	9,8	10,3	10,2	10,7	9,9	9,7	9,5	9,9	10,0	9,9	9,9	9,9	10,1	9,8	9,7	7,8	7,7	7,8	9,5	11,7	10,3				
% Insaturados	88,3	88,8	88,5	89,4	89,9	89,7	88,6	88,8	88,7	89,4	89,4	89,0	90,1	90,2	90,2	89,7	89,8	89,3	90,2	90,3	90,5	90,1	90,0	90,1	90,1	90,2	89,9	90,2	90,3	90,3	92,2	92,3	92,2	88,3	90,5	89,7			
% saturados / % insaturados	0,13	0,13	0,13	0,12	0,11	0,11	0,13	0,13	0,13	0,12	0,12	0,12	0,11	0,11	0,11	0,12	0,11	0,12	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,08	0,08	0,08	0,11	0,13	0,12				
% Palmítico / % Estearico	1,51	1,69	1,51	1,71	1,70	1,71	2,43	2,45	2,50	1,34	1,56	1,41	1,77	1,71	1,72	1,96	1,93	2,05	2,93	3,01	2,86	2,51	2,69	2,37	2,85	2,99	2,65	2,55	2,89	2,62	1,16	1,20	1,14	1,34	3,01	2,19			
% Oleico / % Linoleico	0,43	0,39	0,43	0,53	0,54	0,57	0,26	0,27	0,27	0,47	0,47	0,48	0,46	0,51	0,51	0,36	0,35	0,33	0,29	0,27	0,28	0,34	0,32	0,38	0,28	0,27	0,28	0,37	0,36	0,36	9,12	10,26	10,52	0,26	0,57	0,38			
% Oleico + % Linoleico	88,0	88,5	88,2	89,1	89,7	89,6	88,4	88,5	88,5	89,2	89,0	88,8	89,7	89,8	89,8	89,4	89,5	88,9	89,7	89,9	90,1	89,6	89,6	89,7	89,7	89,7	89,5	89,8	90,0	90,0	91,8	91,8	91,7	88,0	90,1	89,3			

SEMILLAS DE GIRASOL - ENSAYOS 166 AL 198

ENSAYO	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198				
Variiedad	DK-3915			DK-4040			VDH-485			VDH-488			MG-2			CAROLINA			PARAISO 20			ACA 884			ACA 885			SPS 3102			TRISOL 600			MANFREDI 2			
Localidad	MANFREDI 2			MANFREDI 2			MANFREDI 2			MANFREDI 2			MANFREDI 2			MANFREDI 2			MANFREDI 2			MANFREDI 2			MANFREDI 2			MANFREDI 2			MANFREDI 2			CENTRO			
Ensayo	A-019	A-020	A-021	B-019	B-020	B-021	D-019	D-020	D-021	E-019	E-020	E-021	F-019	F-020	F-021	H-019	H-020	H-021	I-019	I-020	I-021	J-019	J-020	J-021	K-019	K-020	K-021	L-019	L-020	L-021	G-019	G-020	G-021				
CROMATOGRAFIA ESTERES METILICOS DE LOS ACIDOS GRASOS																														Min	Máx	Prom					
Mirístico C14.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Miristoleico C14.1	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	
Palmitico C 16.0	5.4	5.7	5.8	5.5	5.5	5.8	6.6	6.8	7.1	5.5	5.0	6.6	5.4	5.4	5.7	5.5	5.6	5.7	6.6	6.5	6.3	5.7	6.1	5.9	6.5	6.5	6.6	6.1	6.2	6.1	3.8	3.7	3.9	5.0	7.1	6.0	
Palmitoleico C 16.1	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.0	0.1
Margarico C 17.0	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	
Margaroleico C 17.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.0
Estearico C 18.0	4.5	4.2	4.0	3.5	3.6	3.2	3.7	3.4	3.5	4.7	4.9	4.6	3.5	3.3	3.2	4.8	3.2	3.2	2.4	2.4	2.5	2.6	2.5	2.7	2.7	2.4	2.5	2.9	2.9	3.0	3.5	3.3	3.2	2.4	4.9	3.3	
Oleico C 18.1	33.0	31.2	30.1	36.1	32.9	30.2	22.0	20.2	19.6	34.3	36.2	36.0	33.8	33.5	31.5	29.4	26.8	27.2	21.5	21.5	23.5	27.6	26.5	27.5	24.7	24.4	24.5	28.4	28.8	28.3	81.8	81.8	78.5	19.6	36.2	28.4	
Linoleico C 18.2	55.8	57.3	58.6	53.5	56.5	59.4	66.2	68.4	68.5	54.1	52.3	51.3	56.3	56.4	58.1	59.0	63.3	62.7	68.3	68.5	66.5	62.9	63.8	62.7	64.9	65.4	65.1	61.2	60.9	61.3	9.0	9.4	12.7	51.3	68.5	61.0	
Linolenico C 18.3	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.0	0.1
Araquidico C 20.0	0.2	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.3	0.3	0.2	0.3	0.2	
Gadoleico C 20.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.9	0.1	0.2	0.2	
Behénico C 22.0	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.5	0.6	0.6	0.8	0.6	0.5	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.9	0.9	0.0	0.5	0.8	0.6		
Lignocérico C24:0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Suma de esterios metilicos	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
VALORES CALCULADOS																															Min	Máx	Prom				
Índice de Iodo (aceite)	124.2	125.5	126.7	123.2	125.6	128.3	133.0	135.1	134.8	122.7	121.2	119.3	125.9	126.0	127.3	126.7	131.9	131.2	136.2	136.5	134.8	131.8	132.4	131.5	133.0	133.7	133.3	129.9	129.6	129.9	85.8	86.4	90.3	119.3	136.5	129.4	
Índice de saponific (aceite)	190.0	190.1	190.0	190.0	190.1	190.2	190.4	190.5	190.0	189.9	190.2	190.0	190.0	190.0	190.1	190.2	190.1	190.2	190.1	190.5	190.4	190.3	190.2	190.3	190.2	190.4	190.4	190.4	190.3	190.3	190.2	189.0	189.0	189.3	189.9	190.5	190.2
Índice de Iodo (trigliceridos)	125.2	126.5	127.8	124.2	126.6	129.3	134.0	136.2	135.9	123.6	122.2	120.3	126.9	127.0	128.3	127.8	132.9	132.3	137.3	137.6	135.9	132.9	133.5	132.6	134.1	134.8	134.4	130.9	130.6	131.0	86.4	87.1	91.1	120.3	137.6	130.4	
Índice de saponific (triglicerid)	191.5	191.6	191.6	191.6	191.6	191.7	191.9	192.0	192.1	191.6	191.4	191.8	191.6	191.5	191.7	191.6	191.7	191.7	192.0	192.0	191.9	191.7	191.8	191.8	191.9	191.9	192.0	191.8	191.8	191.8	190.5	190.5	190.8	191.4	192.1	191.7	
Peso molecular medio (triglic)	879.7	879.4	879.2	879.3	879.2	878.7	877.9	877.3	877.1	879.3	880.1	878.5	879.1	879.4	878.8	879.2	878.6	878.6	877.3	877.5	877.8	878.7	878.0	878.3	877.6	877.5	877.4	878.2	878.2	878.3	884.0	884.2	882.5	877.1	880.1	878.5	
Nº dobles enlaces molécula promedio triolcigeridos	4.3	4.4	4.4	4.3	4.4	4.5	4.6	4.7	4.7	4.3	4.2	4.2	4.4	4.4	4.4	4.4	4.6	4.6	4.7	4.8	4.7	4.6	4.6	4.6	4.7	4.6	4.5	4.5	4.5	3.0	3.0	3.2	4.2	4.8	4.5		
%Saturados	11.0	11.1	11.0	10.0	10.2	10.0	11.4	11.1	11.6	11.2	11.1	12.3	9.7	9.7	9.9	11.3	9.7	9.9	9.8	9.7	9.7	9.2	9.4	9.5	10.0	9.7	9.9	10.0	10.0	10.0	8.7	8.3	7.5	9.2	12.3	10.3	
% Insaturados	89.0	88.9	89.1	90.0	89.8	90.0	88.6	88.9	88.4	88.8	88.9	87.7	90.3	90.3	90.1	88.7	90.3	90.2	90.2	90.4	90.3	90.8	90.6	90.5	90.0	90.3	90.1	90.0	90.0	90.0	91.4	91.7	92.6	87.7	90.8	89.7	
% saturados / % insaturados	0.12	0.13	0.12	0.11	0.11	0.11	0.13	0.12	0.13	0.13	0.12	0.14	0.11	0.11	0.11	0.13	0.11	0.11	0.11	0.11	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.09	0.09	0.08	0.10	0.14	0.11		
% Palmítico / % Esteárico	1.22	1.36	1.46	1.57	1.52	1.84	1.77	1.99	2.01	1.16	1.01	1.42	1.56	1.66	1.79	1.16	1.75	1.78	2.81	2.75	2.47	2.19	2.42	2.22	2.36	2.67	2.66	2.09	2.14	2.06	1.06	1.10	1.25	1.01	2.81	1.90	
% Oleico / % Linoleico	0.59	0.54	0.51	0.68	0.58	0.51	0.33	0.30	0.29	0.63	0.69	0.70	0.60	0.59	0.54	0.50	0.42	0.43	0.32	0.31	0.35	0.44	0.42	0.44	0.38	0.37	0.38	0.46	0.47	0.46	9.13	8.73	6.18	0.29	0.70	0.47	
% Oleico + % Linoleico	88.7	88.5	88.7	89.6	89.4	89.6	88.2	88.6	88.1	88.4	88.5	87.3	90.1	89.9	89.7	88.4	90.0	89.9	89.8	90.0	90.0	90.5	90.2	90.2	89.5	89.8	89.6	89.6	89.7	89.6	90.8	91.1	91.2	87.3	90.5	89.3	

SEMILLA DE GIRASOL - ENSAYOS 232 AL 261

ENSAYO	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261				
Variabilidad	DK-3915			VDH-485			VDH-488			MG-2			CAROLINA			PARAISO 20			ACA 884			ACA 885			SPS 3102			TRISOL 600			TANDIL			
Localidad	TANDIL			TANDIL			TANDIL			TANDIL			TANDIL			TANDIL			TANDIL			TANDIL			TANDIL			TANDIL			SUR			
Ensayo	A-034	A-035	A-036	D-034	D-035	D-036	E-034	E-035	E-036	F-034	F-035	F-036	H-034	H-035	H-036	I-034	I-035	I-036	J-034	J-035	J-036	K-034	K-035	K-036	L-034	L-035	L-036	G-034	G-035	G-036				
CROMATOGRAFIA ESTERES METILICOS DE LOS ACIDOS GRASOS																														Min	Máx	Prom		
Mirístico C14.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	
Miristoleico C14.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Palmitico C 16.0	7.9	5.5	7.3	5.7	6.2	6.1	4.8	4.7	4.7	4.8	4.6	4.6	5.1	5.1	5.4	5.7	6.3	6.1	5.0	4.6	5.0	6.0	5.9	6.0	5.6	5.9	5.6	3.3	3.3	3.1	4.6	7.9	5.6	
Palmitoleico C 16.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	
Margarico C 17.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	
Margaroleico C 17.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	
Estearico C 18.0	5.1	4.9	5.0	4.0	3.9	3.8	5.2	5.0	5.6	4.0	4.0	4.2	4.1	4.1	3.9	3.1	2.6	2.6	3.0	3.3	3.2	3.0	3.0	2.9	3.5	3.3	3.6	3.8	3.6	3.7	2.6	5.6	3.8	
Oleico C 18.1	26.9	27.1	27.2	19.4	19.3	20.1	29.8	29.1	28.6	33.0	34.2	35.5	25.6	23.5	23.3	19.5	19.8	18.8	25.6	24.4	25.4	18.5	17.7	18.3	26.3	25.5	25.8	80.6	79.8	84.2	17.7	35.5	24.7	
Linoleico C 18.2	58.6	60.8	58.9	69.4	69.0	68.5	58.5	59.7	59.4	56.7	55.6	54.2	63.8	65.7	65.6	70.3	69.8	71.1	65.1	66.6	65.2	71.0	71.9	71.3	63.1	63.9	63.4	10.5	11.5	7.3	54.2	71.9	64.3	
Linolenico C 18.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	
Araquidico C 20.0	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.4	0.2
Gadoleico C 20.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.1	0.2	0.2	
Behénico C 22.0	0.6	0.9	0.7	0.6	0.7	0.6	0.8	0.7	0.8	0.7	0.8	0.7	0.6	0.7	0.8	0.6	0.7	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	1.0	1.0	0.9	0.5	0.9	0.7	
Lignocérico C24:0	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.2	0.3	0.2	
Suma de esteres metilicos	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
VALORES CALCULADOS																															Min	Máx	Prom	
Índice de Iodo (aceite)	123.9	127.8	124.9	136.1	135.4	135.1	126.3	127.7	126.8	125.9	125.0	123.7	131.8	133.3	133.1	137.8	137.3	138.6	133.9	135.2	133.8	138.3	139.2	138.6	131.3	131.9	131.3	87.3	88.5	84.8	123.7	139.2	132.0	
Índice de saponific (aceite)	190.4	189.9	190.3	190.1	190.2	190.2	189.7	189.8	189.7	189.8	189.7	189.7	190.0	189.9	190.0	190.2	190.2	190.3	190.0	189.9	190.0	190.2	190.2	190.3	190.1	190.1	190.0	188.9	188.9	188.8	189.7	190.4	190.0	
Índice de Iodo (triglicéridos)	125.0	128.9	125.9	137.2	136.5	136.2	127.3	128.7	127.8	126.9	126.0	124.7	132.9	134.4	134.1	139.0	138.4	139.7	135.0	136.3	134.9	139.5	140.3	139.7	132.3	133.0	132.4	88.0	89.2	85.5	124.7	140.3	133.1	
Índice de saponific (triglicérid)	192.0	191.4	191.9	191.7	191.7	191.3	191.3	191.3	191.3	191.2	191.3	191.5	191.5	191.5	191.7	191.8	191.8	191.5	191.4	191.5	191.8	191.8	191.8	191.6	191.7	191.6	190.4	190.5	190.4	191.2	192.0	191.6		
Peso molecular medio (triglic)	877.5	880.2	878.1	878.9	878.7	878.8	880.7	880.5	880.7	880.6	881.0	880.8	879.7	879.8	879.9	878.7	878.4	878.2	879.7	879.9	879.6	878.4	878.3	878.2	879.2	878.9	879.4	884.4	884.4	884.7	877.5	881.0	879.4	
Nº dobles enlaces molécula promedio triolcéricidos	4.3	4.5	4.4	4.8	4.7	4.7	4.4	4.5	4.4	4.4	4.4	4.3	4.6	4.7	4.6	4.8	4.8	4.8	4.7	4.7	4.7	4.8	4.9	4.8	4.6	4.6	4.6	3.1	3.1	3.0	4.3	4.9	4.6	
%Saturados	14.2	11.9	13.5	10.9	11.4	11.2	11.4	11.0	11.7	10.0	10.0	10.1	10.3	10.5	10.8	9.9	10.1	9.8	9.1	8.9	9.3	10.1	10.0	10.1	10.3	10.3	10.5	8.4	8.2	8.1	8.9	14.2	10.6	
% Insaturados	85.8	88.1	86.5	89.1	88.6	88.8	88.6	89.0	88.3	90.0	90.0	89.9	89.7	89.5	89.2	90.1	90.0	90.3	90.9	91.1	90.8	90.0	90.0	89.9	89.7	89.7	89.5	91.6	91.8	91.9	85.8	91.1	89.4	
% saturados / % insaturados	0.17	0.13	0.16	0.12	0.13	0.13	0.13	0.12	0.13	0.11	0.11	0.11	0.12	0.12	0.12	0.11	0.11	0.11	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.11	0.09	0.09	0.09	0.10	0.17	0.12		
% Palmítico / % Estearico	1.54	1.13	1.47	1.45	1.57	1.59	0.93	0.95	0.83	1.20	1.13	1.09	1.25	1.24	1.38	1.88	2.38	2.38	1.63	1.42	1.56	2.01	2.00	2.06	1.61	1.80	1.55	0.86	0.92	0.85	0.83	2.38	1.52	
% Oleico / % Linoleico	0.46	0.45	0.46	0.28	0.28	0.29	0.51	0.49	0.48	0.58	0.62	0.66	0.40	0.36	0.36	0.28	0.28	0.26	0.39	0.37	0.39	0.26	0.25	0.26	0.42	0.40	0.41	7.68	6.92	11.51	0.25	0.66	0.39	
% Oleico + % Linoleico	85.5	87.9	86.2	88.8	88.3	88.6	88.3	88.8	88.0	89.7	89.8	89.7	89.4	89.2	89.0	89.8	89.6	89.9	90.7	90.9	90.5	89.5	89.6	89.6	89.4	89.3	89.2	91.1	91.4	91.5	85.5	90.9	89.1	

SEMILLAS DE GIRASOL -ENSAYOS DEL 262 AL 291

ENSAYO	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291					
Variedad	DK-3915			VDH-485			VDH-488			MG-2			CAROLINA			PARAISO 20			ACA 884			ACA 885			SPS-3102			TRISOL 600			BARROW				
Localidad	BARROW			BARROW			BARROW			BARROW			BARROW			BARROW			BARROW			BARROW			BARROW			SUR							
Ensayo	A-043	A-044	A-045	D-043	D-044	D-045	E-043	E-044	E-045	F-043	F-044	F-045	H-043	H-044	H-045	I-043	I-044	I-045	J-043	J-044	J-045	K-043	K-044	K-045	L-043	L-044	L-045	G-043	G-044	G-045					
CROMATOGRAFIA ESTERES METILICOS DE LOS ACIDOS GRASOS																														Min	Máx	Prom			
Mirístico C14:0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1		
Miristoleico C14:1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Palmitico C 16:0	5.8	5.5	5.7	6.7	6.4	6.4	5.3	5.6	5.3	5.1	5.3	5.5	5.7	5.5	5.7	6.2	6.5	6.5	5.6	5.9	6.0	6.2	6.3	6.2	6.1	6.1	6.0	3.4	3.8	3.7	5.1	6.7	5.9		
Palmitoleico C 16:1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1		
Margárico C 17:0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.1		
Margaroleico C 17:1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0		
Estearico C 18:0	4.6	5.2	5.6	3.8	4.4	4.2	5.6	5.4	5.5	4.4	4.2	4.1	4.2	3.9	4.4	3.6	3.0	3.1	4.1	3.7	3.6	3.2	3.1	3.1	3.2	3.7	3.9	3.8	4.1	4.3	3.0	5.6	4.1		
Oleico C 18:1	25.0	28.8	29.1	19.4	21.0	20.6	25.2	28.2	30.1	29.5	31.7	28.7	24.4	22.8	23.0	18.6	18.5	18.1	26.3	26.0	25.1	20.5	20.9	20.9	23.6	24.2	25.2	83.6	81.6	81.8	18.1	31.7	24.3		
Linoleico C 18:2	62.8	58.6	57.7	68.3	66.3	67.1	62.1	59.3	57.1	59.6	57.2	60.0	64.2	66.3	65.2	70.0	70.4	70.6	62.6	62.8	63.8	68.6	68.2	68.2	65.8	64.5	63.4	7.1	8.4	8.1	57.1	70.6	64.1		
Linolenico C 18:3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1		
Araquídico C 20:0	0.3	0.4	0.4	0.3	0.3	0.3	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.2	0.5	0.3		
Gadoleico C 20:1	0.2	0.2	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.3	0.3	0.3	0.1	0.2	0.2		
Behénico C 22:0	0.8	0.9	0.9	0.6	0.7	0.6	0.9	0.9	0.9	0.8	0.8	0.8	0.6	0.6	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.5	0.7	0.7	1.1	1.0	1.1	0.5	0.9	0.7		
Lignocérico C24:0	0.3	0.4	0.3	0.4	0.4	0.4	0.2	0.0	0.2	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.4	0.2		
Suma de esteres metilicos	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0					
VALORES CALCULADOS																																	Min	Máx	Prom
Indice de Iodo (aceite)	129.6	125.6	124.2	134.3	132.2	133.1	128.4	126.0	124.3	127.9	125.7	127.9	131.6	133.7	132.0	136.5	137.2	137.2	130.0	130.4	131.3	135.7	135.3	135.3	133.6	131.9	130.8	84.1	84.8	84.3	124.2	137.2	131.2		
Indice de saponific (aceite)	190.0	189.8	189.8	190.3	190.2	190.2	189.9	190.0	189.8	189.9	189.8	189.9	190.1	190.1	190.0	190.2	190.3	190.3	190.0	190.1	190.1	190.2	190.2	190.2	190.3	190.2	190.1	188.8	189.0	188.9	189.8	190.3	190.1		
Indice de Iodo (triglicéridos)	130.6	126.6	125.2	135.4	133.3	134.2	129.5	127.0	125.3	129.0	126.7	129.0	132.7	134.8	133.1	137.6	138.3	138.3	131.1	131.5	132.4	136.8	136.4	136.4	134.6	133.0	131.9	84.8	85.4	85.0	125.2	138.3	132.2		
Indice de saponific (triglicérid)	191.5	191.3	191.3	191.8	191.7	191.7	191.4	191.5	191.3	191.4	191.4	191.4	191.6	191.6	191.5	191.8	191.8	191.8	191.5	191.6	191.7	191.7	191.7	191.7	191.8	191.7	191.7	190.4	190.5	190.4	191.3	191.8	191.6		
Peso molecular medio (triglic)	879.8	880.6	880.6	878.5	879.0	878.9	880.3	879.7	880.5	880.0	880.1	879.9	879.1	879.1	879.5	878.6	878.3	878.2	879.5	879.2	879.0	878.6	878.6	878.7	878.2	878.5	878.9	884.9	884.4	884.6	878.2	880.6	879.3		
N° dobles enlaces molécula promedio triglicéridos	4.5	4.4	4.3	4.7	4.6	4.6	4.5	4.4	4.3	4.5	4.4	4.5	4.6	4.7	4.6	4.8	4.8	4.8	4.5	4.6	4.6	4.7	4.7	4.7	4.7	4.6	4.6	3.0	3.0	3.0	4.3	4.8	4.6		
%Saturados	11.9	12.3	13.0	12.0	12.4	12.1	12.5	12.4	12.4	10.6	10.8	11.0	11.0	10.6	11.4	11.1	10.7	10.9	11.0	10.9	10.8	10.6	10.7	10.6	10.3	11.0	11.1	8.8	9.4	9.6	10.3	13.0	11.3		
% Insaturados	88.1	87.7	87.0	88.0	87.7	88.0	87.5	87.6	87.6	89.4	89.2	89.0	89.0	89.4	88.6	88.9	89.3	89.1	89.0	89.2	89.2	89.4	89.3	89.4	89.7	89.0	89.0	91.2	90.6	90.4	87.0	89.7	88.7		
% saturados / % insaturados	0.14	0.14	0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.11	0.12	0.12	0.10	0.10	0.11	0.11	0.15	0.13		
% Palmitico / % Estearico	1.27	1.06	1.01	1.76	1.47	1.51	0.95	1.03	0.97	1.15	1.26	1.32	1.37	1.43	1.30	1.72	2.18	2.13	1.37	1.59	1.64	1.90	2.00	2.00	1.92	1.66	1.55	0.90	0.91	0.88	0.95	2.18	1.50		
% Oleico / % Linoleico	0.40	0.49	0.50	0.28	0.32	0.31	0.41	0.48	0.53	0.49	0.55	0.48	0.38	0.34	0.35	0.27	0.26	0.26	0.42	0.41	0.39	0.30	0.31	0.31	0.36	0.37	0.40	11.81	9.69	10.06	0.26	0.55	0.38		
% Oleico + % Linoleico	87.8	87.4	86.8	87.7	87.3	87.7	87.2	87.4	87.2	89.1	89.0	88.8	88.6	89.1	88.2	88.5	88.9	88.7	88.9	88.8	88.8	89.1	89.1	89.1	89.3	88.7	88.6	90.7	90.1	89.9	86.8	89.3	88.4		

SEMILLAS DE GIRASOL - ENSAYOS 292 AL 321

ENSAYO	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321				
Variedad	DK-3915			VDH-485			VDH-488			MG-2			CAROLINA			PARAISO 20			ACA 884			ACA 885			SP5 3102			TRISOL 600			BALCARCE RIEGO			
Localidad	BALCARCE RIEGO			BALCARCE RIEGO			BALCARCE RIEGO			BALCARCE RIEGO			BALCARCE RIEGO			BALCARCE RIEGO			BALCARCE RIEGO			BALCARCE RIEGO			BALCARCE RIEGO			BALCARCE RIEGO			SUR			
Ensayo	A-025	A-026	A-027	D-025	D-026	D-027	E-025	E-026	E-027	F-025	F-026	F-027	H-025	H-026	H-027	I-025	I-026	I-027	J-025	J-026	J-027	K-025	K-026	K-027	L-025	L-026	L-027	G-025	G-026	G-027				
ROMATOGRAFIA ESTERES METILICOS DE LOS ACIDOS GRASOS																													Min	Máx	Prom			
Mirístico C14.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	
Miristoleico C14.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Palmitico C 16.0	5.4	5.5	5.3	6.4	6.3	6.1	5.4	4.7	4.8	5.2	5.0	4.8	5.4	5.6	5.3	5.7	5.8	5.7	5.5	5.3	4.9	5.9	5.6	5.6	5.7	5.3	5.5	3.2	3.4	3.1	4.7	6.4	5.5	
Palmitoleico C 16.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.0	
Margárico C 17.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	
Margaroleico C 17.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0
Estearico C 18.0	5.0	5.0	5.5	3.8	4.0	3.9	4.5	5.2	5.3	4.2	4.3	4.4	3.4	3.8	3.8	3.0	3.0	3.2	3.1	3.5	3.7	2.9	3.2	2.9	3.3	3.6	3.3	3.4	3.8	3.8	2.9	5.5	3.9	
Oléico C 18.1	25.9	26.3	26.0	20.0	19.6	19.8	24.7	28.3	26.5	30.0	31.2	31.9	23.8	23.7	25.1	19.7	19.1	18.7	22.4	24.8	26.3	19.0	19.4	18.4	23.5	23.0	23.7	81.0	75.1*	82.7	18.4	31.9	23.7	
Linoleico C 18.2	61.9	61.4	61.4	68.2	68.5	68.5	63.7	60.0	61.7	59.0	57.8	57.4	66.0	65.4	64.1	70.0	70.6	70.8	67.7	65.0	63.6	71.1	70.4	71.6	66.1	66.5	65.9	10.6	16.0	8.6	57.4	71.6	65.3	
Linolenico C 18.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Araquídico C 20.0	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.2	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.1	0.4	0.3	
Gadoléico C 20.1	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.1	0.3	0.2	
Behénico C 22.0	0.9	0.9	1.0	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.6	0.7	0.7	0.6	0.6	0.7	0.6	0.6	0.7	0.7	0.6	0.6	0.6	0.7	0.7	1.0	1.0	1.1	0.6	1.0	0.7	
Lignocérico C24.0	0.1	0.1	0.2	0.3	0.2	0.4	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.1	0.0	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.4	0.2	
Suma de esteres metilicos	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.1	100.0				
VALORES CALCULADOS																												Min	Máx	Prom				
Índice de Iodo (aceite)	128.7	128.4	128.0	134.6	134.8	135.0	131.1	127.7	129.0	127.4	126.3	126.1	134.1	133.0	132.2	137.5	138.0	138.0	135.8	133.2	131.9	138.8	137.9	139.1	133.9	134.3	133.9	87.8	91.9	85.7	126.1	139.1	132.9	
Índice de saponific (aceite)	189.9	189.9	189.8	190.2	190.2	190.1	190.0	189.8	189.8	189.9	189.8	189.8	190.1	190.0	189.9	190.1	190.2	190.2	190.2	190.2	190.2	190.4	190.2	190.2	190.1	190.0	190.0	188.9	188.9	188.8	189.8	190.4	190.0	
Índice de Iodo (triglicéridos)	129.8	129.4	129.0	135.7	135.9	136.1	132.1	128.7	130.1	128.4	127.4	127.1	135.2	134.1	133.2	138.6	139.1	139.1	136.9	134.3	133.0	139.9	139.0	140.2	135.0	135.4	135.0	88.5	92.7	86.4	127.1	140.2	134.0	
Índice de saponific (triglicérid)	191.4	191.4	191.4	191.8	191.8	191.7	191.5	191.3	191.3	191.4	191.4	191.3	191.6	191.6	191.5	191.7	191.7	191.7	191.6	191.5	191.4	191.9	191.7	191.7	191.6	191.5	191.6	190.4	190.5	190.3	191.3	191.9	191.6	
Peso molecular medio (triglic)	880.0	880.0	880.3	878.5	878.5	879.0	879.6	880.7	880.4	879.9	880.3	880.5	879.1	879.2	879.7	878.8	878.8	879.0	878.9	879.5	879.9	877.9	878.8	878.7	879.1	879.5	879.3	884.6	884.1	884.9	877.9	880.7	879.4	
N° dobles enlaces molécula promedio triglicéridos	4.5	4.5	4.5	4.7	4.7	4.7	4.6	4.5	4.5	4.5	4.4	4.4	4.7	4.6	4.6	4.8	4.8	4.8	4.7	4.7	4.6	4.8	4.8	4.9	4.7	4.7	4.7	3.1	3.2	3.0	4.4	4.9	4.6	
%Saturados	11.9	11.9	12.3	11.5	11.6	11.3	11.2	11.3	11.5	10.7	10.6	10.5	9.9	10.6	10.4	9.9	10.0	10.2	9.6	9.9	9.9	9.6	9.9	9.7	10.2	10.2	10.1	7.9	8.5	8.3	9.6	12.3	10.6	
% Insaturados	88.1	88.1	87.7	88.5	88.4	88.7	88.8	88.7	88.5	89.3	89.4	89.5	90.1	89.4	89.7	90.1	90.1	89.8	90.4	90.1	90.1	90.3	90.1	90.3	89.8	89.8	89.9	92.1	91.6	91.7	87.7	90.4	89.4	
% saturados / % insaturados	0.14	0.14	0.14	0.13	0.13	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.11	0.12	0.12	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.09	0.09	0.09	0.11	0.14	0.12	
% Palmítico / % Estearico	1.09	1.10	0.97	1.67	1.58	1.57	1.18	0.90	0.90	1.25	1.15	1.09	1.61	1.46	1.39	1.89	1.94	1.81	1.76	1.52	1.32	2.07	1.79	1.97	1.73	1.48	1.66	0.92	0.90	0.80	0.90	2.07	1.48	
% Oleico / % Linoleico	0.42	0.43	0.42	0.29	0.29	0.29	0.39	0.47	0.43	0.51	0.54	0.56	0.36	0.36	0.39	0.28	0.27	0.26	0.33	0.38	0.41	0.27	0.27	0.26	0.36	0.35	0.36	7.65	4.70	9.65	0.26	0.56	0.37	
% Oleico + % Linoleico	87.7	87.7	87.4	88.1	88.1	88.3	88.5	88.3	88.2	89.0	89.1	89.2	89.8	89.1	89.1	89.7	89.7	89.5	90.1	89.8	89.9	90.0	89.7	90.0	89.5	89.5	89.6	91.6	91.1	91.2	87.4	90.1	89.1	

Nota:

(*) Este dato no cumple con la normativa IRAM para un Aceite de Girasol de "alto oleico". Se lo ha considerado anómalo y por lo tanto desechable. Se estima que proviene de una fecundación anormal, o bien de una indeseada contaminación de las semillas durante su siembra o en el momento de la cosecha.

SEMILLAS DE GIRASOL - ENSAYOS 322 AL 351

ENSAYO	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	BALCARCE							
Variedad	DK-3915			VDH-485			VDH-488			MG-2			CAROLINA			PARAISO 20			ACA 884			ACA 885			SPS 3102			TRISOL 600			SECANO							
Localidad	BALCARCE SECANO			BALCARCE SECANO			BALCARCE SECANO			BALCARCE SECANO			BALCARCE SECANO			BALCARCE SECANO			BALCARCE SECANO			BALCARCE SECANO			BALCARCE SECANO			BALCARCE SECANO			SUR							
Ensayo	A-028	A-029	A-030	D-028	D-029	D-030	E-028	E-029	E-030	F-028	F-029	F-030	H-028	H-029	H-030	I-028	I-029	I-030	J-028	J-029	J-030	K-028	K-029	K-030	L-028	L-029	L-030	G-028	G-029	G-030								
CROMATOGRAFIA ESTERES METILICOS DE LOS ACIDOS GRASOS																																				Min	Máx	Prom
Mirístico C14:0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1				
Miristoleico C14:1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Palmitico C 16:0	5.4	5.8	5.4	6.3	6.0	6.2	5.0	4.8	4.9	4.8	5.0	5.0	5.3	5.5	5.5	5.9	5.8	6.3	5.2	5.6	5.3	5.8	5.8	6.0	5.7	5.7	5.6	3.4	3.3	3.3	4.8	6.3	5.5					
Palmitoleico C 16:1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0					
Margárico C 17:0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0					
Margaroleico C 17:1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
Estearico C 18:0	5.5	4.4	5.5	4.2	4.4	3.9	5.1	5.3	5.5	4.2	4.2	4.3	4.0	4.0	4.0	3.0	3.4	3.2	3.8	3.4	3.4	3.2	2.8	3.0	3.3	3.2	3.8	3.5	3.3	3.0	2.8	5.5	4.0					
Oléico C 18:1	26.3	24.7	26.7	18.1	19.4	19.6	26.3	27.9	26.3	31.4	30.1	30.5	22.2	22.1	21.2	18.7	20.0	18.9	27.4	24.1	24.1	20.4	18.4	18.9	24.3	22.8	23.7	78.0	81.7	79.4	18.1	31.4	23.5					
Linoleico C 18:2	60.4	63.3	60.4	69.5	68.3	68.6	61.6	60.0	61.3	57.9	59.0	58.4	66.6	66.7	67.5	70.6	68.7	69.7	62.0	65.4	65.4	69.1	71.2	70.5	65.1	66.7	65.2	13.5	10.1	12.7	57.9	71.2	65.1					
Linolenico C 18:3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.2	0.1					
Araquídico C 20:0	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.4	0.3					
Gadoleico C 20:1	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.1	0.4	0.2				
Behénico C 22:0	1.2	0.9	1.1	0.8	0.9	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.7	0.8	0.8	0.8	0.7	0.9	0.7	0.8	0.7	0.8	0.8	0.8	1.1	1.0	1.1	0.7	1.2	0.8					
Lignocérico C24:0	0.4	0.2	0.2	0.4	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.2	0.4	0.3					
Suma de esteres metilicos	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0						
VALORES CALCULADOS																																			Min	Máx	Prom	
Índice de Iodo (aceite)	126.8	130.2	126.8	135.3	134.2	134.9	128.7	127.3	128.3	126.6	127.3	126.8	133.8	133.9	134.6	137.8	135.7	136.3	130.2	133.2	133.4	136.7	138.5	137.7	132.9	134.4	132.6	89.9	87.4	89.7	126.6	138.5	132.4					
Índice de saponific (aceite)	189.7	190.0	189.8	190.1	190.0	190.1	189.8	189.7	189.7	189.7	189.7	189.8	189.9	190.0	190.0	190.1	190.0	190.1	189.9	190.0	189.9	190.2	190.1	190.2	190.0	190.0	190.0	188.9	188.9	188.9	189.7	190.2	189.9					
Índice de Iodo (triglicéridos)	127.9	131.3	127.8	136.4	135.3	136.0	129.7	128.3	129.3	127.6	128.3	127.8	134.9	135.0	135.7	138.9	136.8	137.4	131.3	134.3	134.5	137.8	139.7	138.8	134.0	135.5	133.7	90.7	88.1	90.4	127.6	139.7	133.5					
Índice de saponific (triglicérid)	191.2	191.5	191.3	191.7	191.5	191.6	191.3	191.3	191.2	191.3	191.3	191.3	191.4	191.5	191.5	191.7	191.6	191.7	191.4	191.6	191.4	191.7	191.6	191.7	191.5	191.6	191.5	190.4	190.4	190.4	191.2	191.7	191.5					
Peso molecular medio (triglic)	881.3	879.6	880.7	879.2	879.6	879.2	880.7	880.9	881.1	880.8	880.7	880.5	880.1	879.7	879.7	879.0	879.5	879.0	880.2	879.5	880.0	878.8	879.1	878.8	879.5	879.3	879.7	884.5	884.7	884.7	878.8	881.3	879.9					
Nº dobles enlaces molécula promedio triglicéridos	4.4	4.5	4.4	4.7	4.7	4.7	4.5	4.5	4.5	4.4	4.5	4.4	4.7	4.7	4.7	4.8	4.7	4.8	4.6	4.7	4.7	4.8	4.8	4.8	4.6	4.7	4.6	3.2	3.1	3.2	4.4	4.8	4.6					
%Saturados	12.9	11.7	12.7	12.1	12.1	11.5	11.8	11.8	11.9	10.5	10.7	10.8	10.8	10.9	10.9	10.3	10.8	11.0	10.4	10.3	10.1	10.1	10.0	10.3	10.3	10.2	10.8	8.3	7.9	7.7	10.0	12.9	11.0					
% Insaturados	87.2	88.3	87.3	87.9	87.9	88.5	88.2	88.2	88.1	89.5	89.3	89.2	89.2	89.1	89.1	89.7	89.2	89.0	89.6	89.7	89.9	89.9	90.0	89.7	89.7	89.8	89.2	91.8	92.1	92.3	87.2	90.0	89.0					
% saturados / % insaturados	0.15	0.13	0.14	0.14	0.14	0.13	0.13	0.13	0.14	0.12	0.12	0.12	0.12	0.12	0.12	0.11	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.11	0.12	0.11	0.12	0.09	0.09	0.08	0.11	0.15	0.12					
% Palmítico / % Estearico	0.99	1.31	0.99	1.51	1.36	1.59	0.97	0.91	0.89	1.13	1.18	1.18	1.31	1.38	1.38	1.97	1.68	1.98	1.39	1.66	1.56	1.83	2.06	1.99	1.72	1.82	1.50	0.96	1.00	1.09	0.89	2.06	1.45					
% Oleico / % Linoleico	0.43	0.39	0.44	0.26	0.28	0.29	0.43	0.47	0.43	0.54	0.51	0.52	0.33	0.33	0.31	0.26	0.29	0.27	0.44	0.37	0.37	0.30	0.26	0.27	0.37	0.34	0.36	5.77	8.13	6.26	0.26	0.54	0.37					
% Oleico + % Linoleico	86.6	88.0	87.1	87.6	87.7	88.2	87.9	87.9	87.6	89.3	89.1	88.9	88.8	88.8	88.7	89.3	88.8	88.5	89.3	89.5	89.5	89.5	89.6	89.4	89.4	89.6	88.9	91.5	91.7	92.0	86.6	89.6	88.6					

SEMILLAS DE GIRASOL -ENSAYOS 352 AL 381

ENSAYO	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381				
Variedad	DK-3915			VDH-485			VDH-488			MG-2			CAROLINA			PARAISO 20			ACA 884			ACA 885			SPS 3102			TRISOL 600			BALCARCE			
Localidad	BALCARCE SIEMBRA DIRECTA			BALCARCE SIEMBRA DIRECTA			BALCARCE SIEMBRA DIRECTA			BALCARCE SIEMBRA DIRECTA			BALCARCE SIEMBRA DIRECTA			BALCARCE SIEMBRA DIRECTA			BALCARCE SIEMBRA DIRECTA			BALCARCE SIEMBRA DIRECTA			BALCARCE SIEMBRA DIRECTA			BALCARCE SIEMBRA DIRECTA			SIEMBRA DIR.			
Ensayo	A-031	A-032	A-033	D-031	D-032	D-033	E-031	E-032	E-033	F-031	F-032	F-033	H-031	H-032	H-033	I-031	I-032	I-033	J-031	J-032	J-033	K-031	K-032	K-033	L-031	L-032	L-033	G-031	G-032	G-033	SUR			
CROMATOGRAFIA ESTERES METILICOS DE LOS ACIDOS GRASOS																														Min	Máx	Prom		
Mirístico C14:0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	
Miristoleico C14:1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Palmitico C 16:0	5.4	5.7	5.5	6.6	6.8	6.9	5.2	5.0	5.0	5.4	5.3	5.2	5.9	5.9	5.8	6.1	6.3	6.1	5.7	5.8	5.6	6.0	6.1	5.9	6.4	6.0	6.4	4.4	3.6	3.4	5.0	6.9	5.8	
Palmitoleico C 16:1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.1	0.1	0.0	0.2	0.1		
Margárico C 17:0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	
Margaroleico C 17:1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	
Estearico C 18:0	4.5	4.9	5.2	4.6	3.9	3.8	5.2	5.5	5.6	4.1	4.2	4.1	3.4	3.5	3.5	2.7	2.5	2.8	3.3	3.0	3.9	2.5	2.6	2.6	3.5	3.6	2.9	4.0	3.5	3.9	2.5	5.6	3.8	
Oleico C 18:1	24.0	25.4	25.6	20.0	17.7	18.8	26.1	28.9	27.9	27.9	28.0	21.2	21.2	20.5	18.2	19.0	19.4	23.4	21.7	23.5	18.5	18.5	18.5	20.3	22.3	19.9	61.8*	76.7	80.4	17.7	28.9	22.4		
Linoleico C 18:2	64.2	62.2	61.7	67.1	69.9	68.9	61.5	58.7	59.6	60.7	60.9	60.8	67.9	67.6	68.6	71.5	70.6	70.2	66.2	68.1	65.7	71.8	71.4	71.8	68.2	66.4	69.5	28.1	14.4	10.5	58.7	71.8	66.4	
Linolenico C 18:3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	
Araquídico C 20:0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.3	0.2	0.4	0.2
Gadoleico C 20:1	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.1	0.2	0.2	
Behénico C 22:0	1.0	0.8	0.9	0.7	0.7	0.6	0.9	0.8	1.0	0.8	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.8	0.7	0.6	1.0	1.0	1.1	0.6	1.0	0.7	
Lignocérico C24:0	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.3	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.0	0.0	0.0	0.1	0.4	0.2	
Suma de esteres metilicos	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
VALORES CALCULADOS																															Min	Máx	Prom	
Índice de Iodo (aceite)	131.1	129.0	128.3	132.9	135.7	134.9	128.5	126.0	126.5	128.6	128.9	128.9	135.2	134.8	135.8	138.8	138.0	137.6	134.0	135.7	133.2	139.5	138.9	139.4	134.9	133.7	136.7	101.5	90.7	86.9	126.0	139.5	133.5	
Índice de saponific (aceite)	189.8	190.0	189.9	190.2	190.3	190.3	189.8	189.8	189.7	189.9	189.9	189.9	190.1	190.1	190.1	190.2	190.3	190.2	190.1	190.1	190.0	190.3	190.3	190.2	190.2	190.2	190.2	189.3	189.0	188.9	189.7	190.3	190.1	
Índice de Iodo (triglicéridos)	132.2	130.0	129.3	133.9	136.8	136.0	129.5	127.0	127.5	129.6	129.9	130.0	136.3	135.9	136.9	139.9	139.1	138.7	135.1	136.8	134.3	140.6	140.0	140.5	135.9	134.7	137.8	102.3	91.5	87.6	127.0	140.6	134.6	
Índice de saponific (triglicérid)	191.4	191.5	191.4	191.8	191.9	191.9	191.3	191.3	191.3	191.4	191.4	191.4	191.6	191.6	191.8	191.8	191.7	191.6	191.6	191.6	191.8	191.8	191.8	191.7	191.7	191.8	190.8	190.6	190.4	191.3	191.9	191.6		
Peso molecular medio (triglic)	880.1	879.7	880.2	878.6	878.1	878.0	880.5	880.6	880.8	880.1	880.1	880.2	879.2	879.3	879.1	878.5	878.3	878.6	879.2	879.0	879.2	878.2	878.4	878.2	878.7	878.1	882.7	883.9	884.6	878.0	880.8	879.2		
N° dobles enlaces molécula promedio triglicéridos	4.6	4.5	4.5	4.6	4.7	4.7	4.5	4.4	4.4	4.5	4.5	4.5	4.7	4.7	4.7	4.8	4.8	4.8	4.7	4.7	4.7	4.9	4.8	4.9	4.7	4.7	4.8	3.6	3.2	3.1	4.4	4.9	4.7	
%Saturados	11.5	12.1	12.3	12.5	12.0	11.9	12.0	12.0	12.3	11.0	10.8	10.7	10.6	10.8	10.6	10.0	10.0	10.1	10.2	10.0	10.6	9.4	9.8	9.5	11.2	10.8	10.3	9.7	8.4	8.7	9.4	12.5	10.9	
% Insaturados	88.5	88.0	87.7	87.5	88.0	88.1	88.0	88.0	87.7	89.0	89.2	89.3	89.4	89.2	89.4	90.0	90.0	89.9	89.8	90.0	89.4	90.6	90.2	90.5	88.8	89.2	89.7	90.3	91.6	91.3	87.5	90.6	89.1	
% saturados / % insaturados	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.12	0.12	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.11	0.11	0.12	0.10	0.11	0.10	0.13	0.12	0.12	0.11	0.09	0.10	0.10	0.14	0.12	
% Palmítico / % Estearico	1.20	1.17	1.05	1.45	1.77	1.82	1.01	0.90	0.89	1.33	1.26	1.26	1.76	1.67	1.69	2.28	2.48	2.16	1.76	1.92	1.44	2.40	2.31	2.25	1.82	1.68	2.22	1.09	1.05	0.89	0.89	2.48	1.66	
% Oleico / % Linoleico	0.37	0.41	0.42	0.30	0.25	0.27	0.42	0.49	0.47	0.46	0.46	0.46	0.31	0.31	0.30	0.25	0.27	0.28	0.35	0.32	0.36	0.26	0.26	0.26	0.30	0.34	0.29	2.20	5.31	7.69	0.25	0.49	0.34	
% Oleico + % Linoleico	88.3	87.6	87.4	87.1	87.7	87.8	87.6	87.7	87.4	88.7	88.9	88.8	89.1	88.8	89.1	89.7	89.6	89.6	89.5	89.7	89.2	90.3	89.9	90.3	88.4	88.8	89.3	89.9	91.1	90.9	87.1	90.3	88.7	

Nota:

(*) Este dato no cumple con la normativa IRAM para un Aceite de Girasol de "alto oleico". Se lo ha considerado anómalo y por lo tanto desechable. Se estima que proviene de una fecundación anormal, o bien de una indeseada contaminación de las semillas durante su siembra o en el momento de la cosecha.

SEMILLAS DE GIRASOL - ENSAYOS 382 AL 411

ENSAYO	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411						
Variedad	DK-3915			VDH-485			VDH-488			MG-2			CAROLINA			PARAISO 20			ACA 884			ACA 885			SPS 3102			TRISOL 600			CNEL. SUAREZ					
Localidad	CNEL. SUAREZ CONVENCIONAL			CNEL. SUAREZ CONVENCIONAL			CNEL. SUAREZ CONVENCIONAL			CNEL. SUAREZ CONVENCIONAL			CNEL. SUAREZ CONVENCIONAL			CNEL. SUAREZ CONVENCIONAL			CNEL. SUAREZ CONVENCIONAL			CNEL. SUAREZ CONVENCIONAL			CNEL. SUAREZ CONVENCIONAL			CNEL. SUAREZ CONVENCIONAL			CONVENCIONAL					
Ensayo	A-037	A-038	A-039	D-037	D-038	D-039	E-037	E-038	E-039	F-037	F-038	F-039	H-037	H-038	H-039	I-037	I-038	I-039	J-037	J-038	J-039	K-037	K-038	K-039	L-037	L-038	L-039	G-037	G-038	G-039	SUR					
CROMATOGRAFIA ESTERES METILICOS DE LOS ACIDOS GRASOS																																	Min	Máx	Prom	
Mirístico C14,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,0	0,0	0,0	0,1	0,1	0,1		
Miristoleico C14,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0		
Palmitico C 16,0	5,6	5,7	5,7	6,7	6,7	6,8	5,2	5,0	5,1	5,3	5,0	5,2	5,5	5,6	5,7	6,3	5,8	6,1	5,9	5,6	5,9	6,3	5,9	6,2	6,2	5,8	5,8	3,3	3,4	3,2	5,0	6,8	5,8			
Palmitoleico C 16,1	0,0	0,0	0,0	0,1	0,1	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,1	0,0	0,0	0,1	0,0			
Margárico C 17,0	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,0	0,0	0,1	0,1	0,1	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,1	0,0			
Margaroleico C 17,1	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,1	0,0	0,0	0,1	0,0			
Estearico C 18,0	4,4	4,1	4,1	3,9	4,0	4,2	5,9	5,8	5,6	4,2	4,2	4,1	3,9	3,7	3,8	2,6	2,9	2,7	3,4	3,6	3,3	3,0	3,2	2,8	2,7	3,1	2,7	3,6	3,6	3,4	2,6	5,9	3,8			
Oleico C 18,1	25,0	26,1	25,7	18,5	18,7	17,6	26,4	27,3	26,3	27,9	28,6	29,1	22,6	22,4	21,1	19,0	18,9	19,3	22,6	23,7	22,5	17,4	21,1	17,3	23,2	22,5	24,2	86,0	80,5	85,0	17,3	29,1	22,8			
Linoleico C 18,2	63,3	62,2	62,7	69,3	68,9	69,8	60,9	60,3	61,3	60,8	60,5	60,1	66,5	66,8	67,9	70,7	71,0	70,6	66,9	66,0	67,0	71,8	68,4	72,3	66,4	67,1	66,0	5,2	10,5	6,6	60,1	72,3	66,1			
Linolenico C 18,3	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,0	0,0	0,1	0,2	0,1	0,1	0,3	0,3	0,2	0,1	0,1	0,1	0,0	0,3	0,1				
Araquídico C 20,0	0,3	0,4	0,4	0,3	0,3	0,3	0,4	0,3	0,4	0,3	0,3	0,3	0,3	0,3	0,3	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,2			
Gadoleico C 20,1	0,2	0,3	0,3	0,2	0,2	0,1	0,2	0,2	0,2	0,3	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,1	0,2	0,2	0,2	0,2	0,2	0,3	0,3	0,1	0,3	0,2			
Behénico C 22,0	0,9	1,0	0,9	0,7	0,7	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,7	0,7	0,7	0,6	0,7	0,6	0,6	0,7	0,7	0,6	0,6	0,6	0,6	0,7	0,7	1,1	1,0	1,0	0,6	1,0	0,7			
Lignocérico C24:0	0,2	0,3	0,2	0,2	0,2	0,2	0,0	0,0	0,1	0,2	0,2	0,1	0,2	0,2	0,2	0,2	0,2	0,2	0,0	0,0	0,2	0,2	0,2	0,2	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1			
Suma de esteres metilicos	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0		
VALORES CALCULADOS																																		Min	Máx	Prom
Índice de Iodo (aceite)	130,2	129,3	129,8	135,1	134,8	135,4	127,5	127,3	128,1	128,7	128,4	133,9	134,2	135,1	138,1	138,5	138,1	134,4	133,6	134,6	138,8	136,0	139,4	134,8	135,3	134,7	82,9	87,4	84,2	127,3	139,4	133,4				
Índice de saponific (aceite)	189,9	189,9	189,9	190,3	190,3	190,3	189,9	189,9	189,9	189,9	189,8	189,9	190,0	190,0	190,1	190,3	190,2	190,3	190,2	190,1	190,2	190,4	190,2	190,3	190,2	190,2	190,2	188,8	188,9	188,7	189,8	190,4	190,1			
Índice de Iodo (triglicéridos)	131,3	130,4	130,9	136,2	135,9	136,5	128,5	128,3	129,2	129,8	129,4	135,0	135,3	136,1	139,2	139,6	139,2	135,5	134,7	135,6	139,9	137,1	140,5	135,8	136,4	135,7	83,6	88,1	84,9	128,3	140,5	134,5				
Índice de saponific (triglicérid)	191,4	191,4	191,5	191,9	191,8	191,8	191,5	191,4	191,4	191,4	191,4	191,6	191,6	191,6	191,8	191,7	191,8	191,8	191,7	191,7	191,9	191,7	191,8	191,8	191,7	191,7	190,3	190,4	190,3	191,4	191,9	191,6				
Peso molecular medio (triglic)	880,0	880,3	880,0	878,1	878,3	878,2	879,8	880,0	880,1	880,0	880,3	880,0	879,3	879,1	879,1	878,3	878,7	878,3	878,4	878,8	878,8	878,0	878,6	878,2	878,4	878,5	878,5	885,0	884,4	885,0	878,0	880,3	879,0			
Nº dobles enlaces molécula promedio triglicéridos	4,6	4,5	4,5	4,7	4,7	4,7	4,5	4,4	4,5	4,5	4,5	4,5	4,7	4,7	4,7	4,8	4,8	4,8	4,7	4,7	4,7	4,8	4,7	4,9	4,7	4,7	2,9	3,1	3,0	4,4	4,9	4,7				
%Saturados	11,5	11,4	11,3	11,9	12,0	12,3	12,4	12,1	12,1	11,0	10,6	10,5	10,6	10,6	10,7	10,0	9,8	9,8	10,3	10,2	10,3	10,4	10,2	10,1	10,0	10,0	9,4	8,3	8,4	8,0	9,4	12,4	10,8			
% Insaturados	88,5	88,6	88,7	88,1	88,0	87,7	87,6	87,9	87,9	89,0	89,4	89,5	89,4	89,5	89,3	90,0	90,2	90,2	89,8	89,8	89,7	89,6	89,9	89,9	90,0	90,1	90,6	91,7	91,6	92,0	87,6	90,6	89,2			
% saturados / % insaturados	0,13	0,13	0,13	0,14	0,14	0,14	0,14	0,14	0,14	0,12	0,12	0,12	0,12	0,12	0,11	0,11	0,11	0,11	0,11	0,11	0,12	0,11	0,11	0,11	0,11	0,11	0,10	0,09	0,09	0,09	0,10	0,14	0,12			
% Palmítico / % Estearico	1,27	1,37	1,37	1,71	1,66	1,63	0,89	0,86	0,92	1,25	1,18	1,25	1,41	1,52	1,50	2,48	2,00	2,27	1,70	1,55	1,77	2,12	1,85	2,20	2,27	1,84	2,13	0,92	0,96	0,92	0,86	2,48	1,63			
% Oleico / % Linoleico	0,40	0,42	0,41	0,27	0,27	0,25	0,43	0,45	0,43	0,46	0,47	0,48	0,34	0,34	0,31	0,27	0,27	0,27	0,34	0,36	0,34	0,24	0,31	0,24	0,35	0,34	0,37	16,63	7,66	12,92	0,24	0,48	0,35			
% Oleico + % Linoleico	88,3	88,3	88,4	87,8	87,6	87,4	87,3	87,6	87,6	88,6	89,1	89,2	89,1	89,2	89,0	89,7	89,9	89,9	89,6	89,6	89,4	89,2	89,5	89,6	89,5	89,6	90,2	91,2	91,0	91,6	87,3	90,2	88,9			

FIGURA 5 - PROMEDIOS DE ÁCIDO OLÉICO, LINOLEICO E INDICE DE IODO EN ACEITES DE GIRASOL POR VARIEDAD.

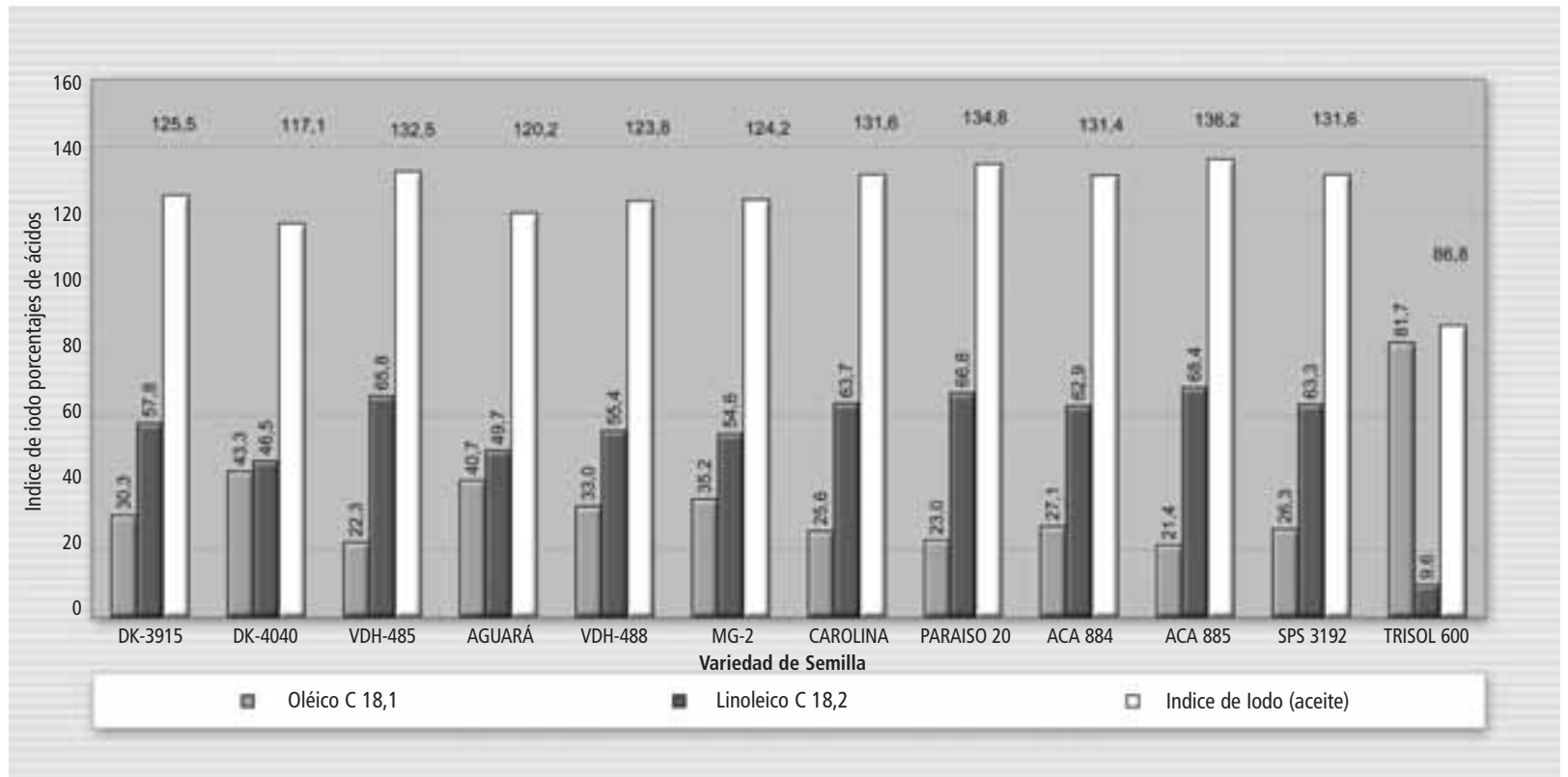
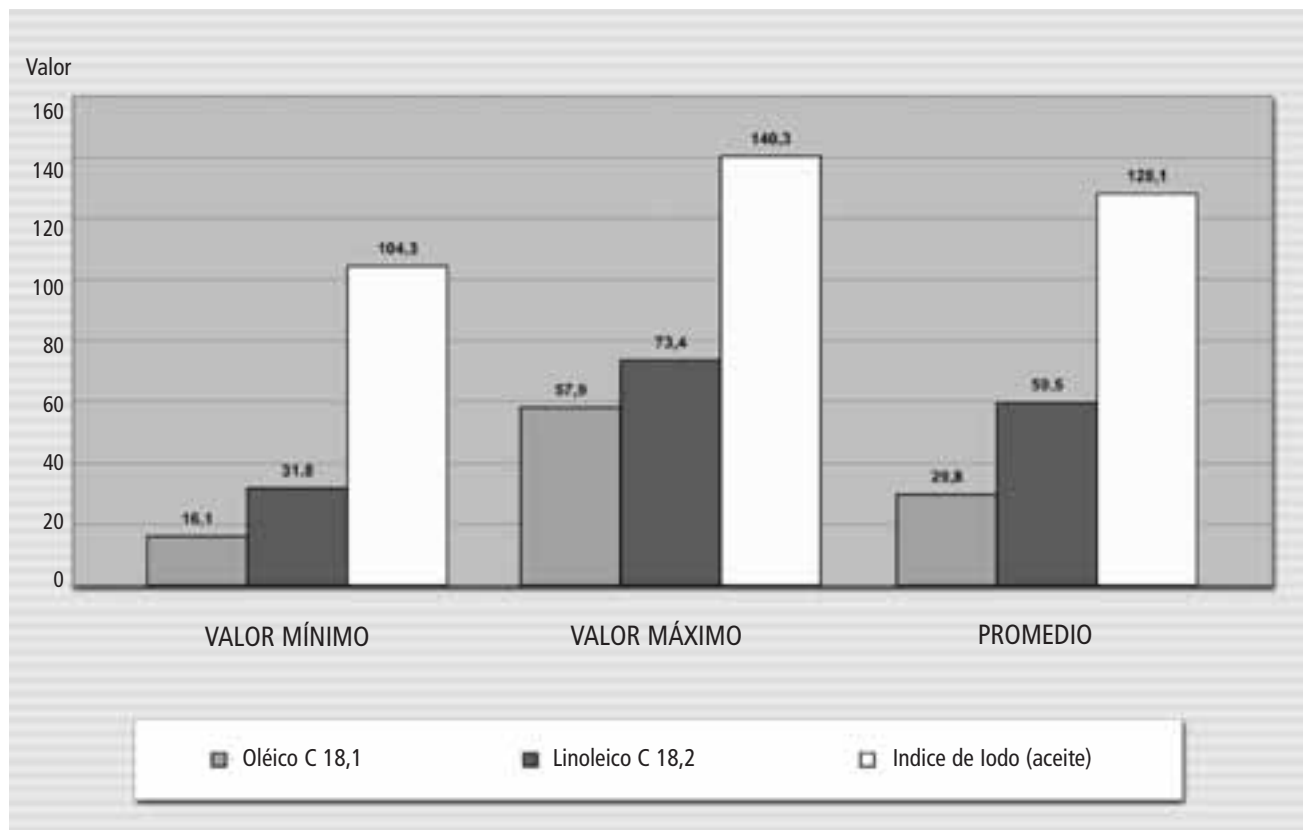


FIGURA 6 - MÍNIMO, MÁXIMO Y PROMEDIOS DE ÁCIDOS OLEICO, LINOLEICO E ÍNDICE DE IODO EN TODAS LAS VARIEDADES Y LOCALIDADES.



SEMILLAS DE GIRASOL POR VARIEDAD SEMBRADAS EN LA REPUBLICA ARGENTINA • COSECHA 2001-2002

VARIEDAD	DK-3915			DK-4040			VDH-485			AGUARÁ			VDH-488			MG-2			CAROLINA			PARAISO 20			ACA 884			ACA 885			SPS-3102			RESUMEN POR VARIEDADES					
	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom
Mirístico C14.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		
Mirísticoleo C14.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	
Palmitico C 16.0	4.9	7.9	5.8	4.7	6.1	5.3	5.7	7.7	6.7	4.7	5.2	5.1	4.6	6.6	5.1	4.6	5.7	5.2	5.1	6.6	5.7	5.5	6.7	6.1	3.1	6.7	5.7	5.6	6.8	6.2	5.2	6.7	5.9	3.1	7.9	5.7	5.7		
Palmitoleico C 16.1	0.0	0.2	0.1	0.0	0.2	0.1	0.0	0.2	0.1	0.0	0.1	0.1	0.0	0.2	0.1	0.0	0.2	0.1	0.0	0.2	0.0	0.0	0.1	0.1	0.0	0.2	0.1	0.0	0.2	0.1	0.0	0.2	0.1	0.0	0.2	0.1	0.1		
Margarífico C 17.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0		
Margaroleico C 17.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0		
Estearico C 18.0	3.1	5.6	4.4	2.3	4.1	3.4	2.7	4.6	3.6	3.1	3.7	3.3	2.9	5.9	4.8	2.3	4.4	3.6	2.1	4.8	3.6	1.8	3.6	2.6	1.8	4.1	3.0	1.9	3.2	2.7	2.3	3.9	3.1	1.8	5.9	3.5			
Oléico C 18.1	24.0	45.0	30.3	30.2	57.9	43.3	17.6	35.6	22.3	35.9	43.6	40.7	24.7	50.3	33.0	26.9	52.8	35.2	20.5	41.9	25.6	18.1	36.8	23.0	18.0	40.3	27.1	16.1	34.9	21.4	19.9	48.7	26.3	16.1	57.9	29.8			
Linoleico C 18.2	43.6	64.2	57.8	31.8	59.4	46.5	54.2	70.6	65.8	47.0	54.1	49.7	39.7	63.7	55.4	37.9	62.1	54.6	48.1	68.6	63.7	53.4	71.5	66.8	49.3	71.0	62.9	55.9	73.4	68.4	42.2	69.5	63.3	31.8	73.4	59.5			
Linolenico C 18.3	0.0	0.2	0.1	0.0	0.1	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.2	0.1	0.0	0.2	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.2	0.1	0.0	0.3	0.1	0.0	0.3	0.1	0.1			
Araquídico C 20.0	0.2	0.4	0.3	0.2	0.3	0.3	0.0	0.3	0.2	0.2	0.3	0.3	0.2	0.5	0.3	0.2	0.3	0.3	0.2	0.3	0.2	0.2	0.4	0.2	0.1	0.3	0.2	0.1	0.5	0.2	0.2	0.3	0.2	0.0	0.5	0.2	0.2		
Gadoleico C 20.1	0.1	0.3	0.2	0.0	0.2	0.2	0.0	0.2	0.1	0.1	0.3	0.2	0.0	0.4	0.2	0.1	0.3	0.2	0.1	0.4	0.2	0.2	0.2	0.2	0.0	0.3	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.0	0.4	0.2	0.2		
Behénico C 22.0	0.6	1.2	0.8	0.6	1.1	0.8	0.4	0.9	0.6	0.6	0.8	0.7	0.6	1.0	0.8	0.5	0.9	0.7	0.5	0.8	0.6	0.4	0.8	0.6	0.4	0.9	0.6	0.4	0.8	0.6	0.5	1.0	0.7	0.4	1.2	0.7	0.7		
Lignocérico C24:0	0.0	0.4	0.1	0.0	0.1	0.0	0.0	0.4	0.2	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.3	0.1	0.0	0.4	0.1	0.0	0.3	0.2	0.0	0.3	0.1	0.0	0.3	0.1	0.0	0.2	0.1	0.0	0.4	0.1	0.1		
VALORES CALCULADOS	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom	Min	Máx	Prom
Índice de Iodo (aceite)	113.5	131.1	125.5	104.3	128.3	117.1	124.1	136.7	132.5	117.8	123.9	120.2	110.5	131.1	123.8	110.3	130.2	124.2	118.6	135.8	131.6	123.1	138.8	134.8	119.3	137.8	131.4	126.1	140.3	136.2	114.3	136.7	131.6	104.3	140.3	128.1	128.1		
Índice de saponific (aceite)	189.6	190.4	190.0	189.5	190.2	189.8	190.0	190.7	190.3	189.7	189.9	189.8	189.6	190.2	189.8	189.6	190.2	189.9	189.9	190.4	190.1	190.0	190.5	190.3	189.5	190.5	190.1	190.1	190.6	190.3	189.8	190.5	190.2	189.5	190.7	190.1	190.1	190.1	
Índice de Iodo (triglicéridos)	114.5	132.2	126.5	105.2	129.3	118.1	125.1	137.8	133.6	118.7	124.9	121.2	111.4	132.1	124.8	111.2	131.2	125.2	119.6	136.9	132.7	124.1	139.9	135.9	120.2	139.0	132.5	127.2	141.5	137.3	115.2	137.8	132.7	105.2	141.5	129.1	129.1		
Índice de saponific (triglicérid)	191.1	192.0	191.5	191.0	191.7	191.4	191.5	192.2	191.9	191.2	191.5	191.4	191.1	191.8	191.4	191.1	191.7	191.4	191.4	192.0	191.6	191.5	192.1	191.8	191.0	192.0	191.6	191.6	192.1	191.8	191.3	192.0	191.7	191.0	192.2	191.0	192.2	191.6	
Peso molecular medio (triglic)	877.5	881.5	879.7	878.7	881.9	880.2	876.5	879.6	878.1	879.8	880.8	880.1	878.5	881.4	880.2	878.7	881.2	880.0	877.5	880.1	879.1	877.0	879.8	878.3	877.2	881.8	879.0	876.9	879.1	878.2	877.3	880.6	878.7	876.5	881.9	879.2	879.2		
Nº dobles enlaces molécula promedio triglicéridos	4.0	4.6	4.4	3.7	4.5	4.1	4.3	4.8	4.6	4.1	4.3	4.2	3.9	4.6	4.3	3.9	4.5	4.3	4.1	4.7	4.6	4.3	4.8	4.7	4.2	4.8	4.6	4.4	4.9	4.8	4.0	4.8	4.6	3.7	4.9	4.5	4.5		
%Saturados 10.0		14.2	11.6	8.9	10.6	9.9	9.6	12.5	11.5	9.1	9.7	9.4	9.4	12.5	11.2	8.5	11.0	9.9	9.1	11.4	10.4	8.9	11.1	9.9	6.8	11.0	9.7	8.8	10.7	9.9	8.8	11.2	10.1	6.8	14.2	10.3	10.3		
% Insaturados	85.8	90.0	88.4	89.4	91.1	90.1	87.5	90.4	88.5	90.3	90.9	90.6	87.5	90.6	88.8	89.0	91.5	90.1	88.6	91.0	89.6	88.9	91.1	90.1	89.0	93.2	90.3	89.3	91.2	90.1	88.8	91.2	89.9	85.8	93.2	89.7	89.7		
% saturados / % insaturados	0.11	0.17	0.13	0.10	0.12	0.11	0.11	0.14	0.13	0.10	0.10	0.10	0.14	0.13	0.09	0.12	0.11	0.10	0.13	0.12	0.10	0.13	0.11	0.07	0.12	0.11	0.10	0.12	0.11	0.10	0.13	0.11	0.07	0.17	0.11	0.11	0.11		
% Palmítico / % Estearico	0.97	1.96	1.35	1.16	2.52	1.61	1.36	2.80	1.90	1.29	1.68	1.53	0.83	1.95	1.11	1.09	2.42	1.50	1.16	2.91	1.64	1.68	3.44	2.39	1.25	3.54	1.94	1.79	3.42	2.39	1.48	2.89	1.98	0.83	3.54	1.76	1.76		
% Oleico / % Linoleico	0.37	1.03	0.54	0.51	1.82	1.00	0.25	0.66	0.35	0.66	0.93	0.82	0.39	1.27	0.63	0.43	1.39	0.67	0.30	0.87	0.41	0.25	0.69	0.36	0.25	0.82	0.44	0.22	0.62	0.32	0.29	1.15	0.44	0.22	1.82	0.54	0.54		
% Oleico + % Linoleico	85.5	89.7	88.1	89.1	90.7	89.8	87.1	89.8	88.1	90.0	90.6	90.3	87.2	90.3	88.5	88.6	91.3	89.8	88.2	90.7	89.3	88.5	90.9	89.8	88.8	92.9	90.0	89.1	90.8	89.8	88.4	90.9	89.6	85.5	92.9	89.4	89.4		
Índice de refracción	1.4709	1.4729	1.4723	1.4698	1.4726	1.4713	1.4721	1.4736	1.4731	1.4714	1.4721	1.4716	1.4705	1.4729	1.4721	1.4705	1.4728	1.4721	1.4715	1.4735	1.4730	1.4720	1.4738	1.4733	1.4715	1.4737	1.4730	1.4723	1.4740	1.4735	1.4710	1.4736	1.4730	1.4698	1.4740	1.4726	1.4726		

SEMILLAS DE GIRASOL VARIEDAD DK-4040

Localidad	R S Peña			LAS BREÑAS			RECONQUISTA			RAFAELA			PARANA			MANFREDI 1			MANFREDI 2			PERGAMINO			DK-4040					
Ensayo	B-001	B-002	B-003	B-004	B-005	B-006	B-007	B-008	B-009	B-010	B-011	B-012	B-013	B-014	B-015	B-016	B-017	B-018	B-019	B-020	B-021	B-022	B-023	B-024	Min	Máx	Prom			
CROMATOGRAFIA ESTERES METILICOS DE LOS ACIDOS GRASOS																									Min	Máx	Prom			
Mirístico C14.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1			
Miristoleico C14.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Palmitico C 16.0	5.4	5.3	5.5	4.7	4.8	5.0	5.6	5.5	5.9	5.1	5.3	5.2	5.2	4.9	6.1	5.7	5.8	5.5	5.5	5.8	4.9	5.2	5.0	4.7	6.1	5.3				
Palmitoleico C 16.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.2	0.1			
Margárico C 17.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.0			
Margaroleico C 17.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0			
Estéarico C 18.0	3.5	3.0	3.7	4.1	3.8	3.7	2.4	2.7	2.3	3.9	3.8	3.8	3.2	3.4	3.0	3.6	3.4	3.4	3.5	3.6	3.2	3.6	3.5	3.8	2.3	4.1	3.4			
Oléico C 18.1	54.1	44.0	42.8	57.1	57.9	57.3	45.6	45.3	43.2	48.6	45.0	46.8	47.1	38.8	50.3	31.0	31.5	32.6	36.1	32.9	30.2	43.9	40.0	38.0	30.2	57.9	43.3			
Linoleico C 18.2	35.6	46.1	46.3	32.7	31.8	32.4	45.1	45.2	47.3	40.8	44.3	42.7	43.2	51.3	40.3	58.2	58.2	56.9	53.5	56.5	59.4	46.1	49.9	51.7	31.8	59.4	46.5			
Linolenico C 18.3	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.0			
Araquídico C 20.0	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.3			
Gadoleico C 20.1	0.2	0.2	0.2	0.2	0.2	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.2	0.2			
Behénico C 22.0	0.7	0.7	0.8	0.8	1.0	1.1	0.6	0.6	0.6	0.9	0.8	0.8	0.8	0.8	1.0	0.7	0.6	0.7	0.7	0.7	0.7	0.8	0.7	0.8	0.6	1.1	0.8			
Lignocérico C24:0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0			
Suma de esteres metílicos	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0				100.0			
VALORES CALCULADOS																												Min	Máx	Prom
Índice de Iodo (aceite)	107.8	117.3	116.6	105.0	104.3	104.6	116.7	116.6	118.5	111.8	114.9	113.6	114.5	121.4	112.3	126.5	127.1	125.8	123.2	125.6	128.3	117.1	120.2	121.5	104.3	128.3	117.1			
Índice de saponific (aceite)	189.8	189.8	189.9	189.5	189.5	189.5	190.0	189.9	190.0	189.7	189.8	189.7	189.7	189.8	189.6	190.1	190.1	190.1	190.0	190.1	190.2	189.8	189.9	189.8	189.5	190.2	189.8			
Índice de Iodo (triglicéridos)	108.6	118.2	117.5	105.9	105.2	105.5	117.6	117.6	119.4	112.7	115.9	114.5	115.4	122.4	113.2	127.6	128.1	126.8	124.2	126.6	129.3	118.0	121.2	122.5	105.2	129.3	118.1			
Índice de saponific (triglicérid)	191.3	191.4	191.4	191.0	191.0	191.0	191.5	191.4	191.6	191.2	191.3	191.3	191.3	191.4	191.1	191.7	191.6	191.6	191.6	191.6	191.7	191.3	191.4	191.3	191.0	191.7	191.4			
Peso molecular medio (triglic)	880.5	880.1	880.1	881.8	881.9	881.7	879.6	879.8	879.3	881.0	880.4	880.7	880.7	880.2	881.4	878.7	879.0	879.1	879.3	879.2	878.7	880.5	880.1	880.3	878.7	881.9	880.2			
N° dobles enlaces molécula promedio triglicéridos	3.8	4.1	4.1	3.7	3.7	3.7	4.1	4.1	4.1	3.9	4.0	4.0	4.0	4.2	3.9	4.4	4.4	4.4	4.3	4.4	4.5	4.1	4.2	4.2	3.7	4.5	4.1			
%Saturados	9.9	9.4	10.4	10.0	10.0	10.2	8.9	9.1	9.1	10.3	10.3	10.1	9.5	9.7	9.2	10.6	10.1	10.3	10.0	10.2	10.0	9.6	9.8	10.0	8.9	10.6	9.9			
% Insaturados	90.1	90.6	89.6	90.0	90.0	89.8	91.1	90.9	90.9	89.7	89.7	89.9	90.5	90.3	90.8	89.4	89.9	89.7	90.0	89.8	90.0	90.4	90.3	90.0	89.4	91.1	90.1			
% saturados / % insaturados	0.11	0.10	0.12	0.11	0.11	0.11	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.11	0.10	0.12	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.10	0.12	0.11			
% Palmítico / % Estéarico	1.56	1.76	1.49	1.16	1.26	1.35	2.30	2.03	2.52	1.31	1.42	1.38	1.62	1.56	1.62	1.71	1.70	1.71	1.57	1.52	1.84	1.38	1.47	1.33	1.16	2.52	1.61			
% Oleico / % Linoleico	1.52	0.95	0.92	1.75	1.82	1.77	1.01	1.00	0.91	1.19	1.02	1.10	1.09	0.75	1.25	0.53	0.54	0.57	0.68	0.58	0.51	0.95	0.80	0.74	0.51	1.82	1.00			
% Oleico + % Linoleico	89.7	90.1	89.1	89.7	89.7	89.7	90.7	90.5	90.6	89.4	89.3	89.6	90.3	90.1	90.6	89.1	89.7	89.6	89.6	89.4	89.6	90.0	89.9	89.6	89.1	90.7	89.8			

SEMILLAS DE GIRASOL DE LA VARIEDAD AGUARÁ

Localidad	R.S. PEÑA			LAS BREÑAS			RECONQUISTA			RAFAELA			AGUARÁ		
	C-001	C-002	C-003	C-004	C-005	C-006	C-007	C-008	C-009	C-011	C-011	C-012	Min	Máx	Prom
Ensayo															
Mirístico C14.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0		0.0	0.1	0.1
Miristoleico C14.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Palmitico C 16.0	4.6	6.0	5.2	4.9	5.0	4.7	5.2	5.1	5.2	5.2	5.1		4.7	5.2	5.1
Palmitoleico C 16.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1		0.0	0.1	0.1
Margárico C 17.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1		0.0	0.1	0.0
Margaroleico C 17.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Estearico C 18.0	3.8	3.2	3.7	3.5	3.1	3.7	3.1	3.1	3.2	3.3	3.5		3.1	3.7	3.3
Oléico C 18.1	48.5	41.2	46.7	42.9	41.5	43.3	43.6	42.9	38.8	36.5	35.9		35.9	43.6	40.7
Linoleico C 18.2	41.8	48.4	43.3	47.5	49.2	47.0	47.0	47.4	51.5	53.6	54.1		47.0	54.1	49.7
Linolenico C 18.3	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Araquídico C 20.0	0.3	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.2	0.3	0.3		0.2	0.3	0.3
Gadoleico C 20.1	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.3	0.2	0.2		0.1	0.3	0.2
Behénico C 22.0	0.7	0.5	0.5	0.6	0.7	0.8	0.6	0.7	0.7	0.7	0.7		0.6	0.8	0.7
Lignocérico C24:0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Suma de esteres metílicos	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0				
VALORES CALCULADOS													Min	Máx	Prom
Índice de Iodo (aceite)	113.5	118.7	114.7	118.5	120.1	117.8	118.1	118.3	121.8	123.5	123.9		117.8	123.9	120.2
Índice de saponific (aceite)	189.7	190.1	189.9	189.8	189.8	189.7	189.8	189.8	189.9	189.9	189.9		189.7	189.9	189.8
Índice de Iodo (triglicéridos)	114.4	119.7	115.6	119.4	121.0	118.7	119.0	119.3	122.8	124.4	124.9		118.7	124.9	121.2
Índice de saponific (triglicérid)	191.2	191.6	191.4	191.3	191.4	191.2	191.4	191.4	191.4	191.5	191.4		191.2	191.5	191.4
Peso molecular medio (triglic)	881.0	879.0	880.0	880.2	880.2	880.8	880.1	880.2	880.0	879.8	879.9		879.8	880.8	880.1
N° dobles enlaces molécula promedio triglicéridos	4.0	4.1	4.0	4.1	4.2	4.1	4.1	4.1	4.3	4.3	4.3		4.1	4.3	4.2
%Saturados	9.4	10.0	9.6	9.3	9.1	9.5	9.2	9.3	9.4	9.6	9.7		9.1	9.7	9.4
% Insaturados	90.6	90.0	90.4	90.7	90.9	90.5	90.8	90.7	90.6	90.4	90.3		90.3	90.9	90.6
% saturados / % insaturados	0.10	0.11	0.11	0.10	0.10	0.11	0.10	0.10	0.10	0.11	0.11		0.10	0.11	0.10
% Palmítico / % Estearico	1.18	1.87	1.40	1.40	1.58	1.29	1.68	1.64	1.66	1.56	1.44		1.29	1.68	1.53
% Oleico / % Linoleico	1.16	0.85	1.08	0.90	0.84	0.92	0.93	0.91	0.75	0.68	0.66		0.66	0.93	0.82
% Oleico + % Linoleico	90.2	89.7	90.0	90.4	90.6	90.2	90.6	90.3	90.3	90.0	90.0		90.0	90.6	90.3

SEMILLAS DE GIRASOL VARIEDAD VDH-488

Localidad	R.S. PEÑA			LAS BREÑAS			RECONQUISTA			RAFAELA			MANFREDI 1			MANFREDI 2			PERGAMINO			BALCARCE RIEGO			BALCARCE SECANO			BALCARCE SIEMBRA DIRECTA			TANDIL			CNEL. SUAREZ CONVENCIONAL			CNEL. SUAREZ SIEMBRA DIRECTA			BARROW			VDH-488										
	E-001	E-002	E-003	E-004	E-005	E-006	E-007	E-008	E-009	E-010	E-011	E-012	E-016	E-017	E-018	E-019	E-020	E-021	E-022	E-023	E-024	E-025	E-026	E-027	E-028	E-029	E-030	E-031	E-032	E-033	E-034	E-035	E-036	E-037	E-038	E-039	E-040	E-041	E-042	E-043	E-044	E-045	Min	Máx	Prom								
Ensayo																																														Min	Máx	Prom					
Mirístico C14.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1			
Miristoleico C14.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Palmitico C 16.0	5.0	4.7	4.6	4.7	4.7	4.8	5.6	5.7	5.7	5.0	4.9	5.5	5.9	5.8	5.5	5.0	6.6	5.2	5.1	5.2	5.4	4.7	4.8	5.0	4.8	4.9	5.2	5.0	5.0	4.8	4.7	4.7	5.2	5.0	5.1	5.2	4.7	4.6	5.3	5.6	5.3	4.6	6.6	6.6	5.1	5.1	5.1	5.1	5.1				
Palmitoleico C 16.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.0	0.2	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		
Margárico C 17.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.0		
Margaroleico C 17.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	
Estéarico C 18.0	3.9	4.5	4.1	5.0	4.3	4.5	2.9	3.3	3.0	4.3	4.4	4.1	3.8	4.1	4.7	4.9	4.6	4.5	4.5	4.4	4.5	5.2	5.3	5.1	5.3	5.5	5.2	5.5	5.6	5.2	5.0	5.6	5.9	5.8	5.6	5.0	5.6	5.4	5.6	5.4	5.5	2.9	5.9	4.8	4.8	4.8	4.8	4.8					
Oleico C 18.1	46.7	49.0	50.3	48.9	46.1	43.5	39.0	36.1	37.9	42.6	43.8	28.6	28.4	28.8	34.3	36.2	36.0	33.2	33.1	35.4	24.7	28.3	26.5	26.3	27.9	26.3	26.1	28.9	27.9	29.8	29.1	28.6	26.4	27.3	26.3	26.5	29.1	27.6	25.2	28.2	30.1	24.7	50.3	33.0	33.0	33.0	33.0	33.0	33.0	33.0			
Linoleico C 18.2	43.0	40.3	39.7	39.8	43.3	45.5	51.2	53.3	52.0	46.6	45.2	60.5	60.6	60.0	54.1	52.3	51.3	55.7	56.1	53.7	63.7	60.0	61.7	61.6	60.0	61.3	61.5	58.7	59.6	58.5	59.7	59.4	60.9	60.3	61.3	61.9	59.1	60.8	62.1	59.3	57.1	39.7	63.7	55.4	55.4	55.4	55.4	55.4	55.4				
Linolenico C 18.3	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		
Araquídico C 20.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.4	0.3	0.3	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.4	0.4	0.2	0.5	0.4	0.2	0.5	0.3	0.3	0.3	0.3		
Gadoleico C 20.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Behénico C 22.0	0.7	0.8	0.8	0.8	0.8	0.9	0.6	0.7	0.7	0.8	0.8	0.7	0.7	0.7	0.6	0.8	0.6	0.7	0.7	0.6	0.7	0.8	0.8	0.9	0.9	0.9	0.9	0.8	1.0	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.9	0.9	0.9	0.6	1.0	0.8	0.8	0.8	0.8	0.8			
Lignocérico C24.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.1	0.2	0.0	0.1	0.2	0.0	0.2	0.0	0.3	0.1	0.1	0.1	0.1	0.1			
Suma de esteres metílicos	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		
VALORES CALCULADOS																																														Min	Máx	Prom					
Índice de Iodo (aceite)	113.9	111.2	111.3	110.5	114.1	115.7	121.8	123.1	122.2	116.7	115.4	128.7	128.8	128.0	122.7	121.2	119.3	124.5	124.9	122.8	131.1	127.7	129.0	128.7	127.3	128.3	128.5	126.0	126.5	126.3	127.7	126.8	127.5	127.3	128.1	129.1	126.6	128.2	128.4	126.0	124.3	110.5	131.1	123.8	123.8	123.8	123.8	123.8	123.8				
Índice de saponific (aceite)	189.7	189.6	189.6	189.6	189.7	189.7	190.0	190.0	190.0	189.7	189.7	190.1	190.2	190.1	190.0	189.9	190.2	189.9	189.9	189.9	190.0	189.8	189.8	189.8	189.7	189.7	189.8	189.8	189.7	189.7	189.7	189.7	189.7	189.9	189.9	189.9	189.9	189.9	189.8	189.7	189.9	190.0	189.8	189.6	190.2	189.8	189.8	189.8	189.8	189.8	189.8		
Índice de Iodo (trigliceridos)	114.8	112.1	112.2	111.4	115.0	116.6	122.7	124.1	123.2	117.6	116.4	129.7	129.8	129.0	123.6	122.2	120.3	125.5	125.9	123.8	132.1	128.7	130.1	129.7	128.3	129.3	129.5	127.0	127.5	127.3	128.7	127.8	128.5	128.3	129.2	130.1	127.6	129.3	129.5	127.0	125.3	111.4	132.1	124.8	124.8	124.8	124.8	124.8	124.8	124.8			
Índice de saponific (triglicerid)	191.3	191.1	191.1	191.1	191.2	191.2	191.5	191.5	191.6	191.3	191.2	191.6	191.7	191.6	191.6	191.4	191.8	191.5	191.4	191.5	191.5	191.3	191.3	191.2	191.3	191.3	191.2	191.3	191.3	191.3	191.3	191.3	191.3	191.5	191.4	191.4	191.4	191.3	191.3	191.4	191.5	191.3	191.1	191.8	191.4	191.4	191.4	191.4	191.4	191.4			
Peso molecular medio (triglic)	880.7	881.3	881.3	881.4	881.0	881.0	879.4	879.4	879.3	880.6	880.9	879.2	878.7	878.9	879.3	880.1	878.5	879.7	879.8	879.5	879.6	880.7	880.4	880.7	880.9	881.1	880.5	880.6	880.8	880.7	880.5	880.7	879.8	880.0	880.1	880.0	880.3	880.7	880.3	880.3	879.7	880.5	878.5	881.4	880.2	880.2	880.2	880.2	880.2	880.2			
Nº dobles enlaces molécula promedio triglicéridos	4.0	3.9	3.9	3.9	4.0	4.0	4.3	4.3	4.3	4.1	4.0	4.5	4.5	4.5	4.3	4.2	4.2	4.3	4.4	4.3	4.6	4.5	4.5	4.5	4.5	4.5	4.4	4.4	4.4	4.4	4.5	4.4	4.5	4.4	4.5	4.4	4.5	4.4	4.5	4.5	4.4	4.3	3.9	4.6	4.3	4.3	4.3	4.3	4.3				
%Saturados	10.0	10.4	9.7	10.9	10.3	10.6	9.4	10.1	9.6	10.5	10.6	10.6	10.6	11.0	11.2	11.1	12.3	10.7	10.6	10.6	11.2	11.3	11.5	11.8	11.8	11.9	12.0	12.0	12.3	11.4	11.0	11.7	12.4	12.1	12.1	11.6	11.7	11.4	12.5	12.4	12.4	9.4	12.5	11.2	11.2	11.2	11.2	11.2					
% Insaturados	90.0	89.6	90.3	89.1	89.7	89.4	90.6	89.9	90.4	89.5	89.4	89.4	89.4	89.0	88.8	88.9	87.7	89.3	89.4	89.4	88.8	88.7	88.5	88.2	88.2	88.1	88.0	88.0	87.7	88.6	89.0	88.3	87.6	87.9	87.9	88.4	88.3	88.7	87.5	87.6	87.6	87.5	90.6	88.8	88.8	88.8	88.8	88.8					
% saturados / % insaturados	0.11	0.12	0.11	0.12	0.11	0.12	0.10	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.13	0.12	0.14	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.13	0.12	0.13	0.14	0.14	0.14	0.13	0.13	0.13	0.14	0.14	0.14	0.10	0.14	0.13	0.13	0.13	0.13	0.13					
% Palmítico / % Estéarico	1.28	1.05	1.12	0.92	1.10	1.07	1.95	1.75	1.92	1.16	1.13	1.34	1.56	1.41	1.16	1.01	1.42	1.14	1.13	1.18	1.18	0.90	0.90	0.97	0.91	0.89	1.01	0.90	0.89	0.93	0.95	0.83	0.89	0.86	0.92	1.06	0.84	0.86	0.95	1.03	0.97	0.83	1.95	1.11	1.11	1.11	1.11	1.11					
% Oleico / % Linoleico	1.09	1.22	1.27	1.2																																																	

SEMILLAS DE GIRASOL VARIEDAD MG-2

Localidad	R.S. PEÑA			LAS BREÑAS			RECONQUISTA			RAFAELA			PARANA			MANFREDI 1			MANFREDI 2			PERGAMINO			BALCARCE RIEGO			BALCARCE SECANO			BALCARCE SIEMBRA DIRECTA			TANDIL			CNEL. SUAREZ CONVENCIONAL			CNEL. SUAREZ SIEMBRA DIRECTA			BARROW			MG-2				
	F-001	F-002	F-003	F-004	F-005	F-006	F-007	F-008	F-009	F-010	F-011	F-012	F-013	F-014	F-015	F-016	F-017	F-019	F-020	F-021	F-022	F-023	F-024	F-025	F-026	F-027	F-028	F-029	F-030	F-031	F-032	F-033	F-034	F-035	F-036	F-037	F-038	F-039	F-040	F-041	F-042	F-043	F-044	F-045	Min	Máx	Prom			
Mirístico C14:0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		
Miristoleico C14:1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Palmitico C16:0	4.8	5.1	4.8	5.0	5.3	4.7	5.5	5.5	5.6	5.0	4.9	4.9	5.4	5.6	5.1	5.7	5.6	5.6	5.4	5.4	5.7	4.9	5.1	5.1	5.2	5.0	4.8	4.8	5.0	5.0	5.4	5.3	5.2	4.8	4.6	4.6	5.3	5.0	5.2	5.4	5.4	5.3	5.1	5.3	5.5	4.6	5.7	5.2		
Palmitoleico C 16:1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.1		
Margárico C 17:0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.0				
Margaroleico C 17:1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0		
Estearico C 18:0	3.2	3.0	3.2	3.6	3.8	3.3	2.3	2.3	2.3	3.3	3.2	3.1	2.3	2.3	2.8	3.2	3.3	3.3	3.5	3.3	3.2	3.5	3.4	3.3	4.2	4.3	4.4	4.2	4.2	4.3	4.1	4.2	4.1	4.0	4.0	4.2	4.2	4.2	4.1	3.8	4.0	4.3	4.4	4.2	4.1	2.3	4.4	3.6		
Oléico C 18:1	49.5	46.8	50.4	48.0	44.5	52.8	40.7	39.0	39.8	45.9	44.8	45.8	36.4	36.5	36.1	28.5	30.5	30.3	33.8	33.5	31.5	36.0	34.4	34.5	30.0	31.2	31.9	31.4	30.1	30.5	27.9	27.9	28.0	33.0	34.2	35.5	27.9	28.6	29.1	29.5	26.9	29.4	29.5	31.7	28.7	26.9	52.8	35.2		
Linoleico C 18:2	41.2	44.1	40.2	41.8	45.0	37.9	50.3	51.7	50.8	44.3	45.6	44.6	54.9	54.5	55.0	61.3	59.3	59.5	56.3	56.4	58.1	54.3	55.6	55.9	59.0	57.8	57.4	57.9	59.0	58.4	60.7	60.9	60.8	56.7	55.6	54.2	60.8	60.5	60.1	59.8	62.1	59.4	59.6	57.2	60.0	37.9	62.1	54.6		
Linolenico C 18:3	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1			
Araquídico C 20:0	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3		
Gadoléico C 20:1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.3	0.2	
Behénico C 22:0	0.7	0.6	0.7	0.7	0.7	0.7	0.5	0.6	0.6	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.7	0.6	0.7	0.7	0.6	0.8	0.8	0.8	0.9	0.9	0.9	0.8	0.8	0.8	0.7	0.8	0.7	0.8	0.8	0.8	0.7	0.7	0.8	0.8	0.8	0.5	0.9	0.7	
Lignocérico C24:0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.0	0.2	0.2	0.0	0.3	0.1	
Suma de esteres metílicos	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		
VALORES CALCULADOS																																																		
Índice de Iodo (aceite)	113.3	115.8	112.4	113.3	115.7	110.3	121.6	122.7	122.0	115.7	117.1	116.1	125.5	125.0	125.3	129.9	128.3	128.5	125.9	126.0	127.3	124.4	125.3	125.8	127.4	126.3	126.1	126.6	127.3	126.8	128.6	128.9	128.9	125.9	125.0	123.7	128.7	128.7	128.4	128.2	130.2	127.5	127.9	125.7	127.9	110.3	130.2	124.2		
Índice de saponific (aceite)	189.7	189.8	189.7	189.7	189.8	189.6	190.0	190.0	190.0	189.8	189.7	189.7	190.0	190.1	189.9	190.2	190.1	190.1	190.0	190.0	190.1	189.9	190.0	190.0	189.9	189.8	189.8	189.7	189.7	189.8	189.9	189.9	189.9	189.8	189.7	189.7	189.9	189.8	189.9	190.0	190.0	189.9	189.9	189.8	189.9	189.6	190.2	189.9		
Índice de Iodo (triglicéridos)	114.2	116.7	113.3	114.2	116.6	111.2	122.6	123.7	123.0	116.7	118.1	117.1	126.6	126.0	126.4	131.0	129.3	129.5	126.9	127.0	128.3	125.4	126.4	126.8	128.4	127.4	127.1	127.6	128.3	127.8	129.6	129.9	130.0	126.9	126.0	124.7	129.8	129.8	129.4	129.2	131.2	128.6	129.0	126.7	129.0	111.2	131.2	125.2		
Índice de saponific (triglicérid)	191.2	191.4	191.2	191.2	191.3	191.1	191.6	191.6	191.5	191.3	191.3	191.2	191.6	191.6	191.5	191.7	191.7	191.6	191.6	191.5	191.7	191.4	191.4	191.3	191.3	191.3	191.3	191.3	191.3	191.4	191.4	191.4	191.3	191.2	191.3	191.4	191.4	191.4	191.5	191.5	191.5	191.4	191.4	191.4	191.4	191.1	191.7	191.4		
Peso molecular medio (triglic)	880.9	880.2	880.9	880.7	880.3	881.2	879.2	879.2	879.4	880.4	880.4	881.0	879.2	879.1	879.7	878.7	878.9	878.9	879.1	879.4	878.8	879.9	879.5	879.5	879.9	880.3	880.5	880.8	880.7	880.5	880.1	880.1	880.2	880.6	881.0	880.8	880.0	880.3	880.0	879.7	879.5	879.9	880.0	880.1	879.9	878.7	881.2	880.0		
N° dobles enlaces molécula promedio triglicéridos	4.0	4.0	3.9	4.0	4.0	3.9	4.2	4.3	4.3	4.0	4.1	4.1	4.4	4.4	4.4	4.5	4.5	4.5	4.4	4.4	4.4	4.4	4.4	4.4	4.5	4.4	4.4	4.4	4.5	4.4	4.5	4.5	4.5	4.5	4.4	4.4	4.3	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.4	4.5	3.9	4.5	4.3	
%Saturados	9.0	8.9	9.1	9.8	10.2	9.1	8.6	8.7	8.8	9.4	9.1	9.2	8.5	8.7	8.8	8.9	9.8	9.8	9.7	9.7	9.9	9.4	9.6	9.3	10.7	10.6	10.5	10.5	10.7	10.8	11.0	10.8	10.7	10.0	10.0	10.1	11.0	10.6	10.5	10.5	10.6	10.9	10.6	10.8	11.0	8.5	11.0	9.9		
% Insaturados	91.0	91.1	90.9	90.2	89.8	90.9	91.4	91.3	91.2	90.6	90.9	90.8	91.5	91.3	91.3	90.1	90.2	90.2	90.3	90.3	90.1	90.6	90.4	90.7	89.3	89.4	89.5	89.5	89.3	89.2	89.0	89.2	89.3	90.0	90.0	89.9	89.0	89.4	89.5	89.5	89.4	89.1	89.4	89.2	89.0	89.0	91.5	90.1		
% saturados / % insaturados	0.10	0.10	0.10	0.11	0.11	0.10	0.09	0.10	0.10	0.10	0.10	0.10	0.09	0.10	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.10	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.11	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.09	0.12	0.11	
% Palmítico / % Estearico	1.50	1.72	1.48	1.38	1.37	1.45	2.38	2.38	2.41	1.50	1.53	1.57	2.40	2.42	1.83	1.77	1.71	1.72	1.56	1.66	1.79	1.42	1.49	1.55	1.25	1.15	1.09	1.13	1.18	1.18	1.33	1.26	1.26	1.20	1.13	1.09	1.25	1.18	1.25	1.42	1.37	1.24	1.15	1.26	1.32	1.09	2.42	1.50		
% Oleico / % Linoleico	1.20	1.06	1.25	1.15	0.99	1.39	0.81	0.75	0.78	1.03	0.98	1.03	0.66	0.67	0.66	0.46	0.51	0.51	0.60	0.59	0.54	0.66	0.62	0.62	0.51	0.54	0.56	0.54	0.51	0.52	0.46	0.46																		

SEMILLAS DE GIRASOLVARIEDAD SPS 3102

Localidad	LAS BREÑAS			MANFREDI 1			MANFREDI 2			PERGAMINO			BALCARCE RIEGO			BALCARCE SECANO			BALCARCE SIEMBRA DIRECTA			TANDIL			CNEL. SUAREZ CONVENCIONAL			CNEL. SUAREZ SIEMBRA DIRECTA			BARROW			SPS 3102			
	L-004	L-005	L-006	L-016	L-017	L-018	L-019	L-020	L-021	L-022	L-023	L-024	L-025	L-026	L-027	L-028	L-029	L-030	L-031	L-032	L-033	L-034	L-035	L-036	L-037	L-038	L-039	L-040	L-041	L-042	L-043	L-044	L-045	Min	Máx	Prom	
Ensayo																																		Min	Máx	Prom	
Mirístico C14.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Miristoleico C14.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Palmitico C 16.0	5.5	5.2	5.3	6.5	6.7	6.5	6.1	6.2	6.1	5.9	6.1	6.0	5.7	5.3	5.5	5.7	5.6	6.4	6.0	6.4	5.6	5.9	5.6	6.2	5.8	5.8	6.2	6.2	6.3	6.1	6.1	6.0	5.2	6.7	5.9		
Palmitoleico C 16.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.2	0.1	
Margárico C 17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0		
Margaroleico C 17.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Esteárico C 18.0	3.1	2.7	3.2	2.5	2.3	2.5	2.9	2.9	3.0	2.6	2.4	2.4	3.3	3.6	3.3	3.3	3.2	3.8	3.5	3.6	2.9	3.5	3.3	3.6	2.7	3.1	2.7	2.8	2.8	3.2	3.2	3.7	3.9	2.3	3.9	3.1	
Oléico C 18.1	45.9	48.7	45.2	24.1	23.8	24.1	28.4	28.8	28.3	26.3	25.7	27.2	23.5	23.0	23.7	24.3	22.8	23.7	20.3	22.3	19.9	26.3	25.5	25.8	23.2	22.5	24.2	22.7	22.8	21.2	23.6	24.2	25.2	19.9	48.7	26.3	
Linoleico C 18.2	43.9	42.2	44.9	65.7	66.2	66.0	61.2	60.9	61.3	64.2	64.6	63.3	66.1	66.5	65.9	65.1	66.7	65.2	68.2	66.4	69.5	63.1	63.9	63.4	66.4	67.1	66.0	67.0	66.9	68.0	65.8	64.5	63.4	42.2	69.5	63.3	
Linolenico C 18.3	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.3	0.1	
Araquídico C 20.0	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.3	0.2	0.2	
Gadoléico C 20.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.2	0.2	
Behénico C 22.0	1.0	0.6	0.8	0.5	0.5	0.5	0.6	0.6	0.6	0.5	0.5	0.5	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.7	0.6	0.6	0.6	0.7	0.6	0.7	0.6	0.6	0.6	0.5	0.7	0.7	0.5	1.0	0.7	0.7	
Lignocérico C24:0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.0	0.0	0.1	0.2	0.2	0.2	0.0	0.1	0.0	0.2	0.1
Suma de esterios metílicos	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
VALORES CALCULADOS																																		Min	Máx	Prom	
Índice de Iodo (aceite)	114.9	114.3	115.9	133.9	134.4	134.2	129.9	129.6	129.9	133.1	133.4	132.3	133.9	134.3	133.9	132.9	134.4	132.6	134.9	133.7	136.7	131.3	131.9	131.3	134.8	135.3	134.7	134.8	134.7	135.2	133.6	131.9	130.8	114.3	136.7	131.6	
Índice de saponifíco (aceite)	189.8	189.9	189.8	190.4	190.5	190.4	190.3	190.3	190.2	190.3	190.3	190.3	190.1	190.0	190.0	190.0	190.0	190.0	190.2	190.2	190.3	190.1	190.1	190.0	190.2	190.2	190.2	190.3	190.2	190.3	190.3	190.2	190.1	189.8	190.5	190.2	190.2
Índice de Iodo (triglicéridos)	115.8	115.2	116.9	135.0	135.5	135.3	130.9	130.6	131.0	134.1	134.5	133.4	135.0	135.4	135.0	134.0	135.5	133.7	135.9	134.7	137.8	132.3	133.0	132.4	135.8	136.4	135.7	135.9	135.8	136.3	134.6	133.0	131.9	115.2	137.8	132.7	132.7
Índice de saponifíco (triglicérid)	191.3	191.4	191.3	192.0	192.0	192.0	191.8	191.8	191.8	191.8	191.9	191.8	191.6	191.5	191.6	191.5	191.6	191.5	191.7	191.7	191.8	191.6	191.7	191.6	191.8	191.7	191.7	191.8	191.8	191.8	191.7	191.7	191.3	192.0	191.7	191.7	191.7
Peso molecular medio (triglic)	880.6	880.1	880.4	877.5	877.3	877.5	878.2	878.2	878.3	878.1	877.8	878.2	879.1	879.5	879.3	879.5	879.3	879.7	878.7	878.7	878.1	879.2	878.9	879.4	878.4	878.5	878.5	878.1	878.4	878.3	878.2	878.5	878.9	877.3	880.6	878.7	878.7
N° dobles enlaces molécula promedio triglicéridos	4.0	4.0	4.1	4.7	4.7	4.7	4.5	4.5	4.5	4.6	4.7	4.6	4.7	4.7	4.7	4.6	4.7	4.6	4.7	4.7	4.8	4.6	4.6	4.6	4.7	4.7	4.7	4.7	4.7	4.7	4.6	4.6	4.0	4.8	4.6	4.6	
%Saturados 9.8	8.8	9.6	9.8	9.7	9.7	10.0	10.0	10.0	9.2	9.3	9.2	10.2	10.2	10.1	10.3	10.2	10.8	11.2	10.8	10.3	10.3	10.3	10.5	10.0	10.0	9.4	10.0	10.0	10.5	10.3	11.0	11.1	8.8	11.2	10.1	10.1	
% Insaturados	90.2	91.2	90.4	90.2	90.3	90.3	90.0	90.0	90.0	90.8	90.8	90.8	89.8	89.8	89.9	89.7	89.8	89.2	88.8	89.2	89.7	89.7	89.7	89.5	90.0	90.1	90.6	89.9	90.0	89.5	89.7	89.0	89.0	88.8	91.2	89.9	89.9
% saturados / % insaturados	0.11	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.10	0.10	0.10	0.11	0.11	0.11	0.12	0.11	0.12	0.13	0.12	0.12	0.11	0.11	0.12	0.11	0.11	0.10	0.11	0.11	0.12	0.11	0.12	0.10	0.13	0.11	0.11	
% Palmítico / % Esteárico	1.76	1.97	1.63	2.55	2.89	2.62	2.09	2.14	2.06	2.28	2.58	2.51	1.73	1.48	1.66	1.72	1.82	1.50	1.82	1.68	2.22	1.61	1.80	1.55	2.27	1.84	2.13	2.24	2.19	1.95	1.92	1.66	1.55	1.48	2.89	1.98	1.98
% Oleico / % Linoleico	1.05	1.15	1.01	0.37	0.36	0.36	0.46	0.47	0.46	0.41	0.40	0.43	0.36	0.35	0.36	0.37	0.34	0.36	0.30	0.34	0.29	0.42	0.40	0.41	0.35	0.34	0.37	0.34	0.34	0.31	0.36	0.37	0.40	0.29	1.15	0.44	0.44
% Oleico + % Linoleico	89.8	90.9	90.1	89.8	90.0	90.0	89.6	89.7	89.6	90.5	90.4	90.5	89.5	89.5	89.6	89.4	89.6	88.9	88.4	88.8	89.3	89.4	89.3	89.2	89.5	89.6	90.2	89.7	89.2	89.3	88.7	88.6	88.4	90.9	89.6	89.6	



Asociación Argentina de Grasas y Aceites

Hipólito Yrigoyen 1284 · 3° Piso · Dpto. 5
(C1086AAV) · Ciudad Autónoma de Buenos Aires · Argentina
Tel/fax: 54 (11) 4381 0555 / 4382 9122
asaga@asaga.org.ar
www.asaga.org.ar